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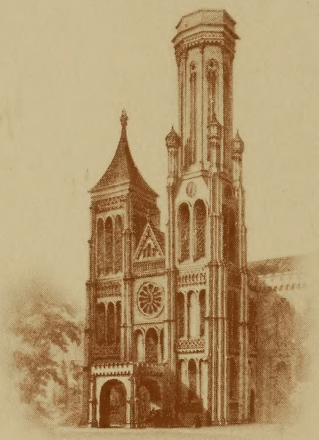

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VOL. XXIV, No. 7 WASHINGTON JULY, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

WILD ANIMALS THAT TOOK THEIR OWN PICTURES BY DAY AND BY NIGHT

By George Shiras, 3rd

Mr. Shiras, as a pioneer in camera hunting and the originator of night photography of wild animals, has also assisted in the conservation of wild life by being the author, when in Congress, of the original bills putting under Federal control migratory fish and migratory birds, which latter measure, known subsequently as the Weeks-McLean Bill, became a law March 4, 1913. This act, covering migratory wild-fowl, and by later amendment insectivorous birds, is the most important bird legislation ever enacted for the benefit of sportsmen, nature lovers, and agriculturists. In a brief filed with the Senate in 1912, Mr. Shiras also suggested a series of international agreements to protect birds migrating between nations, and a resolution has been offered in the Senate calling upon the President to negotiate such treaties.

Readers of the National Geographic Magazine will recall with much pleasure the very original and instructive articles by Mr. Shiras, previously published in this magazine, as follows: "Photographing Wild Game with Flashlight and Camera," with 72 illustrations; "One Season's Game Bag with the Camera," with 70 illustrations; "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," with 26 illustrations, and "The White Sheep, Giant Moose, and Smaller Game of Kenai Peninsula, Alaska," with 62 illustrations.—Editor.

IN THE hopeful endeavor to contribute an individual share toward the knowledge of animal life and perhaps to stimulate that interest by pictorial representations more appealing than the writer's pen, there are hereafter presented the home life and forms of a number of wild animals, common and rare, some of which wander every night within a stone's throw of nearly every rural home, while others frequent a sanctuary offered in some distant wilderness.

THE AUTOMATIC CAMERA IN THE PICTURING AND STUDY OF ANIMAL LIFE

The purpose of this article is to show that a camera and accessories can be so arranged that any animal or bird and many a reptile, however large or small, agile or cunning, may have its picture faithfully recorded, during daylight or darkness, without the immediate presence of a human assistant.

While most birds and daylight-feeding animals, like the elk, caribou, mountain sheep and goat, and small animals, such as the squirrel and woodchuck, present no insurmountable difficulties in photography, getting a good picture of others is often uncertain or irksome when the game photographer must either await their coming or attempt a near approach.

In many instances, owing to the nocturnal character of the animal, the keen-

Photo by George Shiras, 3rd

A WHITE-TAIL BUCK TAKES ITS OWN PICTURE IN DAYTIME

While pawing in the sand for salt the animal struck the camera string with the left foot. The picture was taken in June, when the animal was in a gaunt condition and the horns partly grown (see page 772).

ness of scent and vision, with the habit of skulking in thick underbrush or occupying points of vantage where no approach can be made, I have usually found it a waste of effort to try to get pictures in the ordinary way; for, even if occasionally successful, the loss of time can be avoided by the use of the set camera.

As a rule, the fur-bearing animals and those of predaceous habits are the hardest to photograph with a hand-manipulated camera, for they seldom appear in daylight and fear an artificial light at night. To meet these difficulties, I have developed methods suitable to the habits of each animal. In the main, I have used many of the devices of the trapper rather than the hunter, substituting the automatic camera for the trap and using the same baits and scents in favorable localities and during the season of the year when success was likely.

The greatest immediate pleasure which comes to the camera hunter when, on foot, he can successfully stalk, or in a canoe quietly paddle up to, a big-game animal, and at other times get pictures from the recess of a well-concealed blind, can still be followed while, at the same time, there are secreted in the forest or along the waterways several cameras capable of picturing the living form of many an elusive animal, and that, too, without the loss of time or patience.

In this branch of photography one should have a fair knowledge of the habits and range of the animal sought; for while there are many—if they can be located—that will seize almost any kind of bait, regardless of human scent or the appearance of a poorly concealed camera, such as the raccoon, opossum, skunk, muskrat, woodchuck, rabbit, or squirrel; yet in the case of others, like the beaver, bear, fox, wolf, and deer, one should follow the cautious methods of the trapper when he erects a dead-fall, sets a steel trap, or puts out poisoned bait.

Then, toward the close of the day,

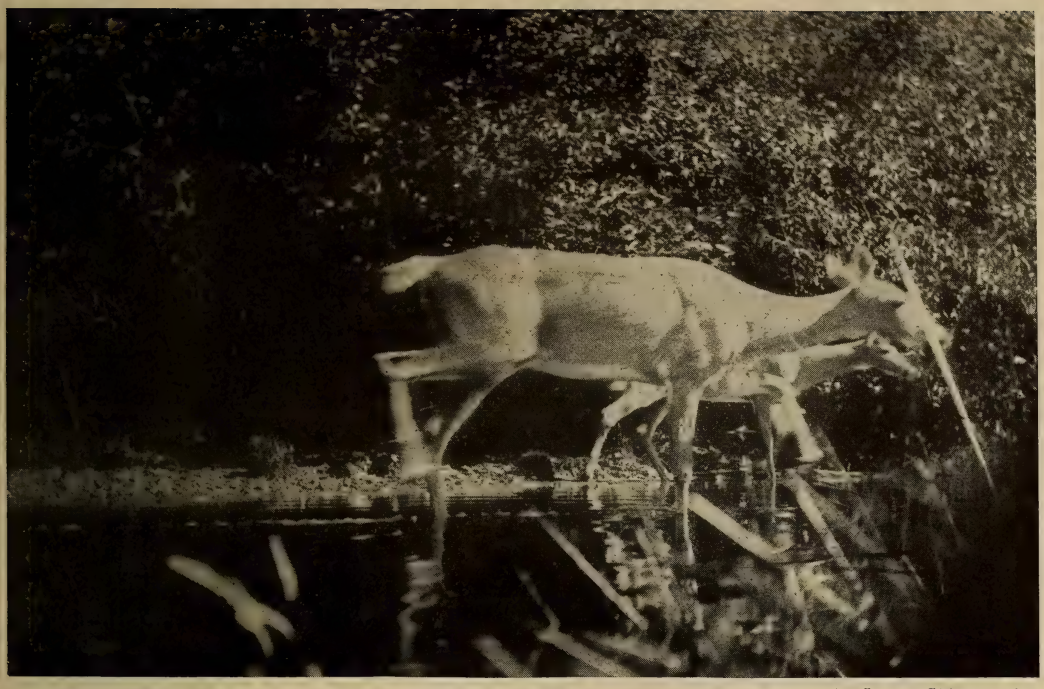

Photo by George Shiras, 3rd

A PAIR OF WHITE-TAIL DOES WHO TOOK THEIR OWN PICTURES

The camera was placed on an abandoned muskrat house, and as the deer ran splashing by to escape the flies, the string was broken. This photograph was made in 1889, before the focal-plane shutter was available.

when the fading light puts an end to the use of the hand camera, one may expectantly visit the camera traps, and if the string across the runway is broken or the bait disturbed, the surroundings should be carefully examined for the hoof-marks of a frightened deer or the scratches made by the claws of some carnivorous animal fleeing on the click of the revolving shutter. If, however, no visitor has come, the flashlight machine may be adjusted and the shutter of the camera reset at a much slower speed, so that when some night prowler presses against the string or eagerly pulls at the bait the flash will illuminate the surroundings while the sensitive plate records the scene.

Then, when the blazing camp-fire accentuates the darkness of the night, the sportsman, lying within the narrow circle of its warmth, may suddenly see a dazzling column of light ascend on a distant hillside, or illuminating with a momentary flutter the gloomy valley of some water-course; and in a few seconds the deep, dull boom of the exploding powder suggests an animal fleeing in needless terror from a spot where the weapon contained no bullet and where its recorded visit will prove a source of pleasure to one who meant it no bodily harm. As I usually explode a compound of magnesium powder in a hermetically sealed box—to insure higher speed and the exclusion of moisture—I have sometimes heard the report at a distance of three miles and noticed the flash at a much further distance.

Therefore one can imagine the surprise and terror of some timid animal when experiencing the first dazzling explosion. Yet, as will be shown later, the pangs of hunger or the cravings for some particularly choice food will lead many of these animals to return to the interrupted feast, and in the course of time the blinding light and roar seem to be regarded as a harmless manifestation of nature, like thunder or lightning. And then one may, if he desires, get a series of interesting night pictures, in every at-

Photo by George Shiras, 3rd

A DOE MOTTLED BY INTERCEPTED SUNLIGHT

"The need of sunlight and the fact that a passing cloud or the shifting light may throw the deer in heavy or broken shadows is one reason why a camera set out at night with the flashlight is often preferable" (see text, page 772).

titude and action. An example of this was shown by an article in this magazine several years ago, illustrating the nightly visits of the same coon to bait placed at the edge of a little lake.*

In taking a picture from a canoe by flashlight one must be able to judge short distances accurately in order to have the animal in proper focus. In a different way, but for the same reason, it is equally important that automatically taken pictures should come within the focus for which the camera was set in advance. With the bait placed at a given distance, little trouble arises, but when the animal sought is a deer or a moose coming to the water or feeding grounds, the problem becomes more difficult, because the intercepting string must be touched at the point where the animal will be in sharp focus.

Whenever animals are traveling on a well-defined runway, a string running to a stake on the opposite side will insure a good picture, because the camera can be previously focused on the runway; but if such animals are to be photographed when wandering along the shores of a pond or traveling in a creek bottom, it is important that natural conditions be taken advantage of, so that the animal will be forced to pass at a fixed distance from the camera, as will be the case where the shore is narrowed by driftwood, rocks, or mud-holes.

Quite often temporarily erected obstructions will accomplish the same purpose, provided no scent is left and the material used is in harmony with the surroundings. Otherwise, in order to avoid having the camera sprung at a point where it is not in focus, the string can be run along the ground and then raised a foot or two high by forked sticks at the spot where the animal is most likely to pass.

* See "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," National Geographic Magazine, June, 1911.

Photo by George Shiras, 3rd

NIGHT PICTURE OF WHITE-TAIL BUCK AND DOE

Beyond the ridge was a large, white pine log, where the camera and flashlight were set, the string running to a pine opposite. Flash probably fired by the doe

Usually I encamped near enough to hear the report of the flash, but sometimes it may be set many miles away, or perhaps I am in town or on a side trip, in which case it has not been unusual for the camera to remain unvisited for a week or ten days. But this is of little consequence; for, with the shutter opening and closing automatically, the exposed plate is safe until called for. On pages 767 and 768 are a couple of pictures of deer taken when I was many miles away.

PHOTOGRAPHING THE WHITE-TAIL DEER

The alphabet for the beginner in wild-life photography usually comprises nesting birds of the neighborhood, chipmunks, the lazy and sun-loving woodchuck, or the stolid porcupine, and even then many difficulties confront the novice, the overcoming of which opens the door for picturing rarer or more active subjects.

Some who take up camera hunting become discouraged by early failures and are unable to see how such an instrument can ever be a satisfactory substitute for the sportsman's gun. Others, with their interest only intensified by defeat, continue on until won over by the attractiveness of a contest where success costs no life or an awkwardly handled camera leaves no wounded animal to die a lingering death.

Photo by George Shiras, 3rd

A WHITE-TAIL DOE

Here a fallen tree narrowed the runway along the shore, so that the deer was sure to be in focus when the flash was fired

My first photographic efforts, however, were directed toward big game animals and began many years ago (1887), when quite satiated with the conquests of the gun and the regrettable recollection that success meant a more or less painful death of some timid animal, whose body was usually unnecessary for food and whose horns or hide had become superfluous trophies no longer justifying deadly pursuit.

That I should have begun by trying to photograph such a wary creature as the white-tail deer had an explanation in the fact that this animal had been my favorite quarry with the rifle, and having hunted it from my youth I knew its habits well, thereby appreciating its resourcefulness in avoiding danger. No member of the deer family is harder to photograph in the daytime, although it is the most abundant and widely distributed member of its kind.

Naturally I was confronted with many obstacles, mostly due to ignorance of photography, and had I not been the fortunate possessor of a good lens at the beginning and one of the first hand cameras made in this country, it is likely this pastime would have lost an ardent advocate. Persistent pursuit and the trial of many methods finally suggested ways of getting pictures with ease and certainty, for in the end few wild animals can escape the gun, trap, or the camera when hunted with care and energy.

The white-tail deer has a wonderfully keen ear and an equally keen nose and its eyesight, as with most of the deer tribe, is not of a particularly discriminating kind, yet the slightest sound or scent will result in an accurately directed glance toward the source of danger, and then it is useless to try for a picture, although the animal may be within fair range of the rifle.

Photo by George Shiras, 3rd

A DOE THAT TOOK ITS OWN PICTURE A DOZEN TIMES

"After taking the third picture, it was impossible to get the deer to spring the flashlight; for, although unquestionably the black silk thread was invisible at night, a slight pressure on the upper limbs was noticed immediately and the deer retreated. The abundance of porcupines and rabbits prevented placing the thread closer to the ground. To meet this difficulty, the leaves of a freshly cut bush were saturated with salt water, and when the deer pushed into it the pressure of the thread was unnoticed until too late" (see text, page 777).

DAYLIGHT PICTURES

As daylight photography of deer usually requires direct sunlight, with the animal free from interfering brush, it is easy to understand how a close approach on foot is difficult, although in a canoe one may frequently surprise a deer at a short bend in a stream or often get excellent pictures at close range when hiding in a favorably located blind.

Such pictures of deer are best obtained in the early summer months, when seeking their favorite aquatic plants or going to water-courses to escape the flies. Then they are easily located and can be taken in exposed situations, where the illumination is good and no brush or trees cut off the view of the camera.

It was not long after discovering the difficulty of getting within photographic distance of deer, whether in a canoe or on foot, that the idea suggested itself of concealing a camera 25 feet from a runway or near a narrow portion of the shore, so that a thread running from the shutter to a stake, tree, or log would result in a picture if any animals passed by. Even then, when one might be miles away, the lingering scent from the much-handled and near-by camera required the wind to be favorable when selecting a place. Elk, moose, or caribou will push against and generally break an intervening thread, but a white-tail deer in many cases will retreat the instant it feels the slightest pressure on the breast

Photo by George Shiras, 3rd

THE SAME DEER BRINGING HER FAWN TO THE WATER, WHEN THE LATTER LEARNS OF FLASHLIGHT PHOTOGRAPHY

"Seven pictures were taken in 60 days, when came the best surprise of all; for one night the doe brought her half-grown fawn to the river, and with little concern the latter walked into the flashlight string just as the doe came into view; but even then the instinctive effort of the fawn to avoid the sharp pressure of the thread [illegible]

Photo by George Shiras, 3rd

ANOTHER NIGHT THE DOE FIRES THE FLASH AND THE FAWN LOOKS ON WITH INTENSE INTEREST

"Ten days later the doe walked into the thread in a mass of loose branches, and it, too, threw back its leg in the same way; while the fawn, with all the appearance of knowing that there was apt to be trouble in this locality, is shown gazing in an expectant way at its mother" (see text, page 777).

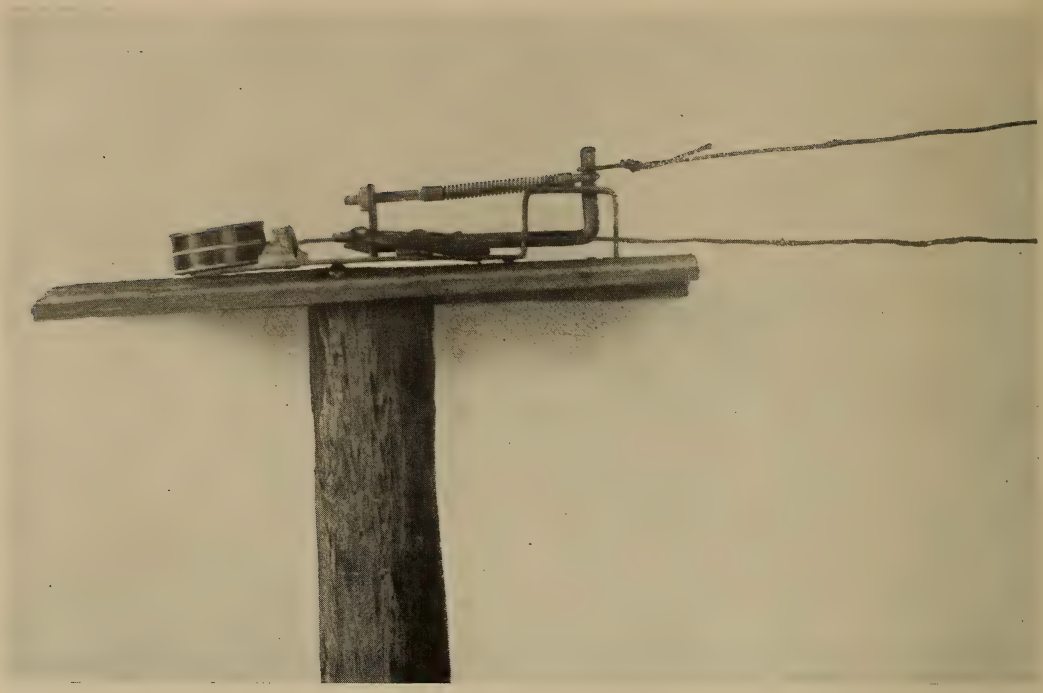

Photo by George Shiras, 3rd

HAND FLASHLIGHT MACHINE CONVERTED INTO AN AUTOMATIC ONE

The upper string runs to the shutter; the lower one, connected with the trigger, is baited at the other end or extends across the runway. The round pasteboard box contains the powder. This apparatus was patented by author in 1893 and thereupon dedicated to public use.

or upper limbs. To photograph a deer the line must be close to the ground, where it may be often overstepped or be in the way of a wandering porcupine (see page 816).

When, however, deer are in a playful mood or rushing through the water or along the shore to escape the flies, they are unable to check themselves on touching the thread and the result is a picture full of action (see page 765). By throwing a handful of salt on the beach and running the thread across the spot, it is easy to get pictures of the animals pawing the earth in search of the salt (see page 764). The need of sunlight and the fact that a passing cloud or the shifting light may throw the deer in heavy or broken shadows is one reason why a camera set out at night with the flashlight is often preferable (see page 766).

NIGHT PICTURES OF DEER

It now seems strange to recall the time when it was considered sportsmanlike to kill big-game animals at night by means of a jack-light in the bow of a canoe; yet when I first began shooting deer in the early 70's, "fire-hunting," as it was then called, was not only deemed entirely proper, but a very agreeable diversion, being the usual method resorted to in getting a supply of venison when camping near small lakes or sluggish streams, and especially if still-hunting during the day had proved unsuccessful.

Copying this method from the Chippewa Indians, then the principal tribe on Lake Superior, the light I first used was a crude affair, made by burning pine pitch in an old frying-pan, with pieces of birch bark added when about to shoot. As the rays of such a light were not concentrated and affected somewhat by smoke, the deer were usually shot within a circle of 50 feet or less. Later I used a small lantern, with a good reflector, and as experience soon showed that a deer had little chance of escaping a charge of buckshot, my

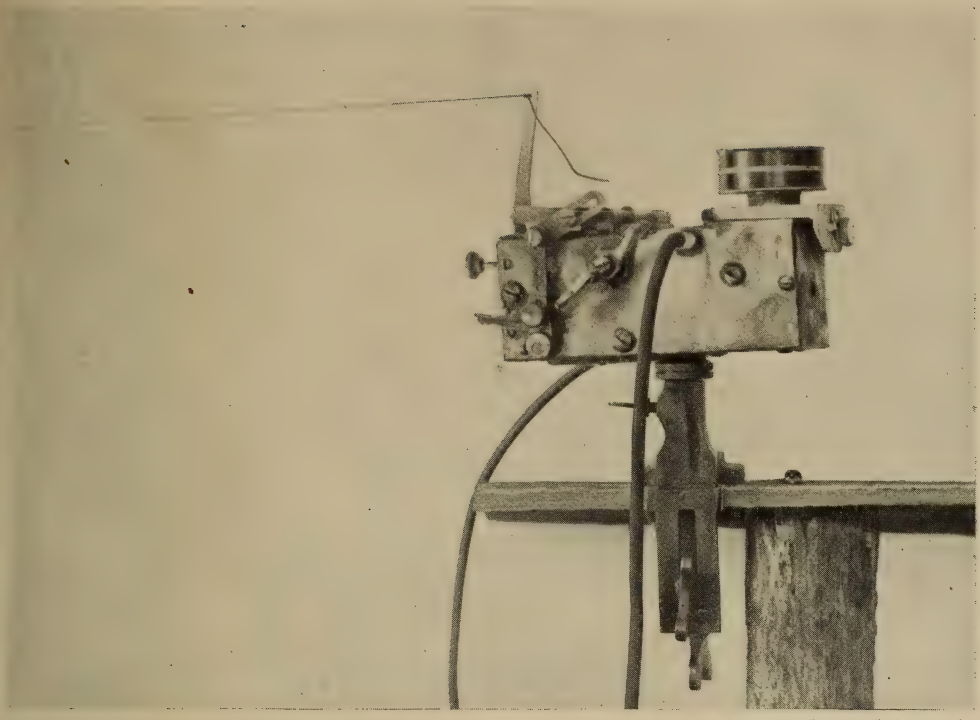

Photo by George Shiras, 3rd

THE AUTOMATIC FLASHLIGHT APPARATUS IMPROVED BY AN AIR PUMP

The pump operates the shutters of one, two, or three cameras as the flash is fired. Patented by the author's guide, J. H. Hammer, in 1903. A picture of this apparatus in use is shown on page 801. The author considers this the most reliable method yet devised.

equally young shooting companion and I agreed to only use a rifle, just as a little later we spared does and fawns in night shooting. With the opening up of northern Michigan by several lines of railway came the market-hunter, and so destructive was his use of the jack-light, both in a canoe or as a headlight on a blazed trail—many killing 100 to 200 deer in the early fall months—that it soon became apparent, in the absence of prohibitory legislation, the deer were doomed, especially since most of those killed at night were does.

Before any legislation had prohibited fire-hunting in Michigan I had given it up and assisted in the movement to end such slaughter.

Still later, when the time came that I preferred hunting with the camera, I often felt how unfortunate it was, after an unsuccessful day with the camera, either by reason of cloudy weather or inability to locate any deer, that I could not go out after dark and get deer pictures under the jack-light with the same ease that I formerly got their carcasses.

Then, too, there is a peculiar and never-ending fascination in canoeing at night, when the evening stillness brings to the keen ear the crooning of the porcupine, the chirping of the cricket, the gentle croaking of the frog, or the soft flutter of an owl circling on wings of velvet. When a muskrat jumps off a log or a pickerel in the shallow water darts against the side of the boat, one gives an involuntary start at sounds magnified a dozen times by the high tension of the watcher. To the straining eye of the one in the bow, confined to the diverging avenue of light cast by the jack-light revolving on its staff, the overhanging branches and the bleached or gnarled trunks assume weird shapes, and when finally there is detected the intermittent swish-swish-swish of a deer wading knee deep here and there in search of tender roots, one tries to pierce the darkness ahead for the first faint

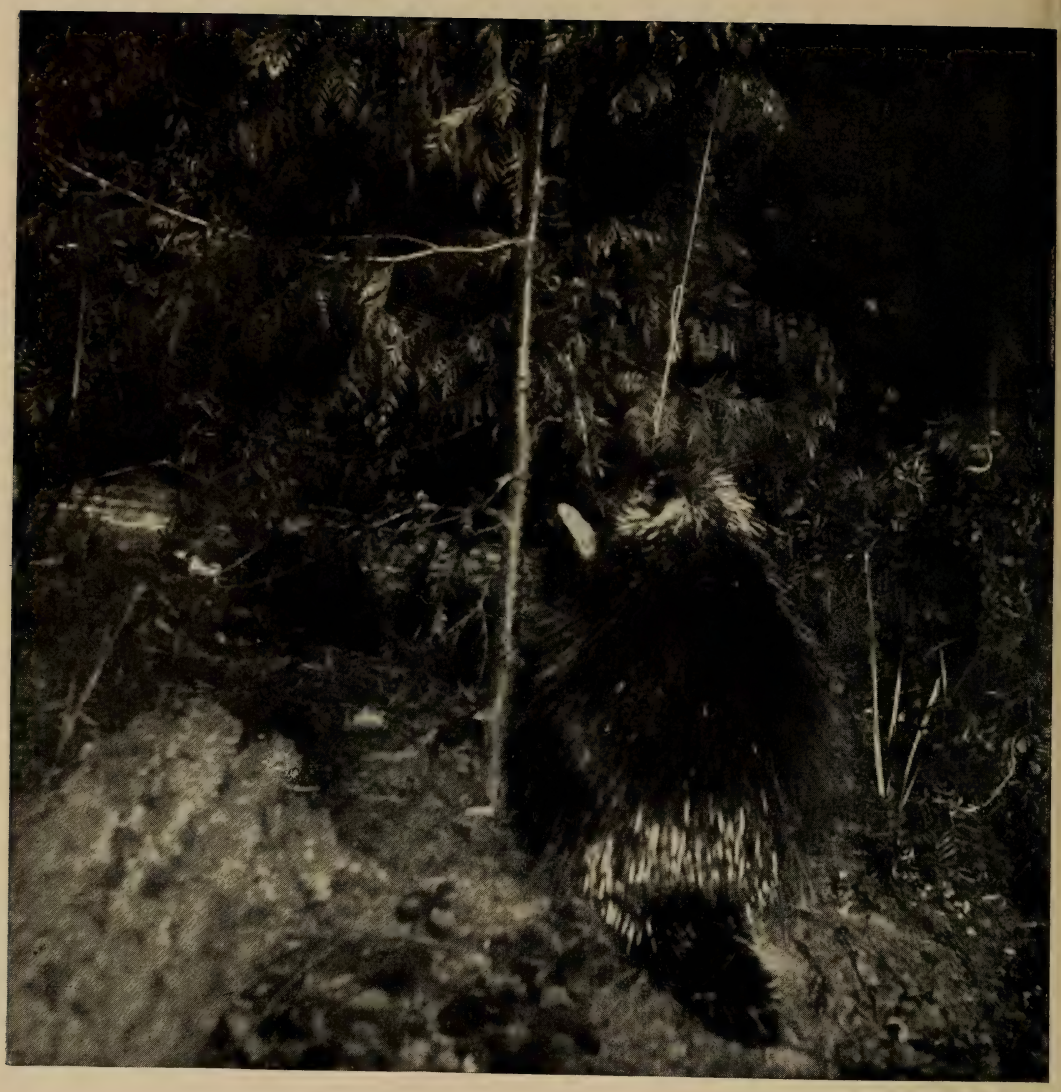

Photo by George Shiras, 3rd

A PORCUPINE FIRES THE FLASHLIGHT

Attracted by a bone saturated with salt water, a big, black "porky" is shown pulling on the string (see page 779)

glimmer of the lantern light, reflected like balls of fire in the eyes of the suspicious deer. And then sometimes the novice, seeing the momentary glow of a firefly or the glistening dewdrop on the reeds, imagines he sees a shadowy form and fires at the apparition. When, however, the blue, translucent glow of the watching eyes appear, and the approaching gray form grows into the graceful image of a deer, the time has come when the gun or flashlight breaks in on the stillness of the night and the implement used determines whether one prefers the bloody carcass and its transient use or a picture that will live long after the pursued and the pursuer have passed away.

In the first use of the hand flashlight I met with many adventures and much ill-success, due to the slow magnesium powder then manufactured and the still slower means of ignition—methods that were fairly satisfactory for interior pictures, but useless on damp or windy nights, when the flash had to be fired the instant the deer came in focus and with

Photo by George Shiras, 3rd

THEN CAME A LIGHT-COLORED PORCUPINE (SEE PAGE 779)

This animal was of a yellowish-white hue and may have been a descendant of the albino porcupine described by the author at length in a previous issue (see NATIONAL GEOGRAPHIC MAGAZINE, June, 1911.

the same quickness as a gun. Some deer ran away just when I ignited the powder, and others staring at the lantern light gave a convulsive movement of the head the instant the slow powder exploded, so that all such pictures were worthless, though I thoroughly enjoyed the effort of getting within 25 feet of a feeding deer and the excitement both aboard the canoe and on shore when the spluttering flash went off.

Gradually I constructed an apparatus that could be fired with ease and certainty, and as the speed of the powder was improved all difficulty vanished in getting night pictures from a canoe.

DEER THAT TOOK THEIR OWN PICTURES AT NIGHT (see pp. 767-768)

The white-tail deer, unlike moose and elk, will rarely face a jack-light again at close range when once it has been shot at with a gun or flashlight, for it associates the explosion in either case with the innocent lantern, and when this light is once more seen approaching across the

Photo by George Shiras, 3rd

TREE TRUNKS SEMIGIRDLED BY PORCUPINES

The author's more recent investigations sustain the theory that the porcupine avoids killing mature trees by eating all the bark about the base. It took the animal three days to eat the bark on the above tree, and then it went to the adjoining one, where it was equally careful in removing the bark. Note how the inner wood shows the broad teeth-marks of the animal (see page 781).

dark waters or coming through the woods, it bounds off snorting or quietly skulks away before one gets within range.

This form of night photography, therefore, in addition to being a bloodless sport, has doubtless saved the lives of many deer that otherwise would have fallen before the deadly gun of the numerous headlight hunters. On several occasions I heard some of these chaps complaining about the difficulty of getting within gunshot of deer in the neighborhood of White Fish Lake; but the reason for this was never explained to them.

Finally, when most of the deer near camp became sophisticated and would not tolerate a jack-light, and again because there were times when the full moon rendered the artificial light useless, or because deer often fed in localities not accessible by canoe, I concluded to put the flashlight out after dark in the hope that it would prove as successful as the set camera in the daytime.

With but very little change in the hand flashlight, it was converted into an automatic one, and so adjusted that the slightest pull of a string would fire the flash, the shutter opening and closing simultaneously (see page 772). This was the beginning of the automatic flashlight and led to a much more diversified use of the camera at night.

A DEER THAT TOOK ITS OWN PICTURE A DOZEN TIMES

Perhaps the most interesting experiment I have made with a set camera occurred when I endeavored to get a series of pictures of the same deer—an effort that was accomplished under conditions favoring the trial. On a stream not far above camp an old doe was in the habit of coming to the water nearly every night to feed upon a succulent form of water grass growing at that point. It would not stand the jack-light and rarely appeared before dark.

So, clearing space in the alders and throwing out some cabbage leaves and turnips, well sprinkled with salt, it was not long before their disappearance and the clear-cut hoof tracks explained the reason. Then an empty, well-weathered box, with a hinged lid, was placed on a log, and there it remained until the deer fed without suspicion. Cutting a round hole in the box, the camera was placed therein and a string from the flashlight

Photo by George Shiras, 3rd

A MUSKRAT PULLING ON A CELERY ROOT

During several seasons, by automatic camera and flashlight, a large number of night pictures were taken of muskrats, which are not easy to photograph in daytime, as they are largely nocturnal or abroad only toward dusk (see text, page 782).

stretched across the feeding place. Water was dashed wherever any trace of scent was apt to be, and that night came a flash, visible from my bed-room window. A good picture resulted and the camera was reset; but nothing came for nearly 10 days, when once more a picture of the same deer was taken. This time no effort was made for another picture, but the place was kept well baited, until from a canoe I could see fresh tracks in the mud, when the camera was once more placed in the box.

After taking the third picture it was impossible to get the deer to spring the flashlight; for, although, unquestionably the black silk thread was invisible at night, a slight pressure on the upper limbs was noticed immediately and the deer retreated. The abundance of porcupines and rabbits prevented placing the thread closer to the ground. To meet this difficulty, the leaves of a freshly cut bush were saturated with salt water, and when the deer pushed into it the pressure of the thread was unnoticed until too late. The flash shows the deer nibbling away (see page 769).

Seven pictures were taken in 60 days, when came the best surprise of all; for one night the doe brought her half-grown fawn to the river, and with little concern the latter walked into the flashlight string just as the doe came into view (see page 770); but even then the instinctive effort of the fawn to avoid the sharp pressure of the thread is shown by the fore right leg being thrown against the body. Ten days later the doe walked into the thread in a mass of loose branches, and it, too, threw back its leg in the same way; while the fawn, with all the appearance of knowing that there was apt to be trouble in this locality, is shown gazing in an expectant way at its mother (see page 771).

Photo by George Shiras, 3rd

A MUSKRAT WHO IS BEING INTRODUCED TO CARROTS AND LIKES THEM (SEE PAGE 783)

FLASHLIGHT OF DOE AND TWIN FAWNS

The picture of the white-tail doe and two fawns, appearing as the supplement, is an example of night photography from the bow of a canoe, and is intended to serve as a contrast to the series taken by automatic means in the accompanying article. Therefore a brief description of how this picture was taken may be of interest.

One quiet, warm evening early in July, 1896, the canoe left camp for the south end of Whitefish Lake, where it was reasonably certain several deer would be found on arrival or after a short wait. On the way I suggested crossing the lake to look for a deer in a little bay where an old and long abandoned logging road came to the shore, between high bluffs, and the only place accessible for deer coming to the water in half a mile.

When the jack-light began to bring in faint relief the shores of the bay we saw a pair of glowing eyes, but before the body became distinct the deer gave a snort, and running up the trail a ways, stopped. Backing the canoe off a short distance, the animal finally returned to the water; but as the light came nearer it bounded off again. This performance was repeated several times, indicating pretty clearly that the animal was one I had flashed before, or was one that had providentially escaped a load of buck-shot fired by a pot-hunter using a head-light. Growing discouraged, I gave the signal to continue down the lake; but the guide, believing the deer would soon grow less suspicious, held the boat a few minutes longer.

Suddenly, on the right, I heard the tell-tale ripple made by a deer entering the water, and turning the jack-light in that direction, was surprised to see three pairs of glimmering eyes. On a nearer approach I was delighted to see a large doe and two beautifully spotted fawns—a picture long and hopefully wished for. The mother deer was feeding on a plant common in such waters, while the fawns romped about with an abandon indicat-

ing a dependence upon a milk diet. When within 25 yards the doe became restless under the light and turned up the shore toward the old lumber road; but the fawns, apparently enjoying the illuminated shore, ran to and fro in a way to prevent getting the entire group on the small plate.

With great anxiety I awaited the moment when the three would come in closer proximity, and several times was greatly tempted to fire the flash when the doe and one fawn were in a good position. Just as the doe reached the trail and when I feared that in the effort to get the three all would escape, the fawns ran in behind their mother, preparing to follow in her clearly intended retreat; so I gave a shrill whistle, the finger resting on the trigger of the flashlight for instant action. The fawns turned broadside as the mother stepped ashore and in open-eyed amazement gazed at the round ball of fire, which had hitherto been so silent. Bang! went the flash, and a great tongue of flame and a column of white smoke ascended to the top of the trees.

Opening my left eye, which had been purposely closed when the blinding flash was fired, I saw the doe running up the trail, while the fawns, directly facing the dazzling flame, were temporarily blinded and jumped about in great confusion; one finally struggled up the shore in collision with brush and projecting logs, while the other jumped into the water and headed directly for the canoe, dimly seeing a lighted way in front of the jack when all else about was dark and impenetrable. As it passed by I seized it gently by the slender neck, whereupon the guide, who had a long standing order for a young deer, asked me to pull it aboard; but the thought of a capsize, with the loss of a negative more valuable to me than the prize money in sight for the guide, and the thought, too, of separating forever these frolicksome twins, led me to turn the swimmer ashore. And when we returned an hour later, the absence of bleating cries showed the family reunited, but doubtless still in a state of wonder at a whistling moon which had blown up in such an unexpected and terrifying manner.

HOW PORCUPINES TOOK THEIR OWN PICTURES

Having in a previous issue described the habits and range of the porcupine,* reference now will be confined to the manner in which the accompanying pictures were taken (1912), with a few additional observations upon the alleged instinct of the animal in never completely girdling the base of the tree when feeding on the lower bark.

Where porcupines are abundant they are easy animals to photograph. On five occasions I even got their pictures at night on the same plate with deer. But any effort to coax such a stolid, tree-inhabiting rodent to take its own picture by flashlight, and at a spot where the camera must be placed more or less at random, presented something of a problem. Subsisting almost exclusively upon the bark, twigs, and leaves of certain trees, including particularly, in the fall, the needles of coniferous ones, like the hemlock, this animal is not often found seeking ground food except in the summer, when it visits ponds and lakes for aquatic plants. Consequently months might pass without a picture if the bait used consisted of the common form of vegetation found throughout its range. Like most rodents, however, the porcupine enjoys gnawing the bones or shed antlers of wild animals, and also has a keen relish for any substance impregnated with salt. Therefore it seemed to me there could be found no greater attraction than a salted bone. The two big "porkies"—one unusually light-colored, the other unusually dark, with a bone between their uplifted paws, tell the story of the effort (see pages 774 and 775).

Having heretofore only casually noticed the manner in which trees were barked by porcupines, I had reached no definite conclusion thereon; so when last fall, while looking for a good place to

* See "A Flashlight Story of an Albino Porcupine and of a Cunning but Unfortunate Coon," NATIONAL GEOGRAPHIC MAGAZINE, June, 1911.

Photo by George Shiras, 3rd

THIS MUSKRAT TOOK POSSESSION OF THE CAMP CARROT PATCH. ROUNDED UP BY USE OF A BROOM (NOTE UPPER LEFT-HAND CORNER), IT WAS PHOTOGRAPHED AT CLOSE RANGE (SEE PAGES 783 AND 784)

Photo by George Shiras, 3rd

SEIZED BY THE TAIL, IT WAS HELD ALOFT FOR THE PURPOSE OF SHOWING ITS EVER-INCREASING GIRTH (SEE PAGE 784)

set out the camera, I found a compact area where the majority of certain mature trees had bark eaten from the trunk, I carefully examined and counted them as follows: 18 silver birches, 5 elms, 4 maples, 3 each of white pine and hemlock. Not one of the numerous balsam trees had been touched. In only two instances were the trees completely girdled, and in each case in different years, the last animal either not realizing it was killing the tree or not noticing the old cutting. In the same neighborhood the upper and terminal limbs of a number of young pines were denuded of bark, and in several cases the trees were dead or dying.

The strong teeth of the porcupine are admirably adapted for removing the heavy bark, and, as in the case of the beaver, this animal can chisel out large pieces. The picture on page 776 shows how cleanly the bark was removed and eaten, the inner wood showing plainly the scoring made by the flat teeth and how carefully the animals avoided removing more than half the bark.

MUSKRATS AND THEIR HOMES AND HABITS

While the steady advance in the value of muskrat skins has led many a trapper who was wont to pass them by to put them on his list of desirables, these animals withstand onslaught better than any other of the fur-bearers, due to their fecundity and wide distribution rather than any ability to elude capture.

Every frequenter of the wilderness, as well as the watchful ruralist, is familiar with the swimming figure of this inhabitant of the marshes, and toward evening sometimes sees him waddling along the banks or astride a partially sunken log deftly opening mussel shells—about the only flesh sought by this aquatic rodent. Often muskrats are more abundant in the marshes of a partly settled district, where the mink and other enemies have been long ago eliminated and where the farmer boy, rather than the professional trapper, has been its only enemy; but its greater relative abundance and the increasing value of the pelt makes it now well worth the effort of the skillful trap-

Photo by George Shiras, 3rd

THE GLUTTON'S END (SEE PAGE 784)

The same muskrat seizing carrot at edge of the dock before the author could get more than a few feet away from exploding flash. In this picture the animal resembles a miniature grizzly bear. A few days after it died, probably as a result of its carrot debauch.

per to visit the marshes bordering civilization, and soon it will be numbered among the missing or the rare in many parts of the country.

Largely nocturnal or abroad toward dusk, and then usually in the water, the muskrat is not an easy animal to photograph in daytime. In the summer of 1910 I concluded that an animal which was so abundant and which had heretofore refused to pose for a picture must be sought systematically and with due care.

Naturally night pictures, with the aid of the baited string, was the plan in mind, and the only question of importance was the kind of bait likely to coax the animals out of water and in a place where the camera could be set and easily examined. As an experiment, celery was put on the logs near the runways, or close to the entrance of the summer homes, in the banks of a stream and marsh near camp. The following night the celery had disappeared; thereupon four stakes were driven in the water opposite a log from which the bait had been taken, while a board was placed on top for the support of the camera. Another and heavier stake behind held the flashlight apparatus, and from it ran a string to and through an eye-screw in an overhanging branch, with a piece of celery attached to the end. That night the exploding powder was heard and the developed plate showed a chunky muskrat reaching up for the bait (see page 777). Every night thereafter the muskrats came, regardless of weather, and a good set of pictures soon resulted.

Two seasons later more muskrat pictures were taken, but mostly for the purpose of showing their recently constructed winter homes. Instead of celery, carrots were substituted, being taken from a large bed in front of the cabin. Thereafter every muskrat in the vicinity became reckless with delight, and long before dark the flash would be prematurely fired, necessitating setting it out

Photo by George Shiras, 3rd

FLASHLIGHT OF A MUSKRAT BUILDING ITS WINTER HOME IN THE MARSH (SEE PAGE 782)

after dusk. Sometimes the canoe would not get away more than 50 feet before the explosion came, showing that the expectant animals were watching near by. After taking many pictures, the camera and flash were set out for rabbits in a little swamp near the stream, and I wondered what the muskrats would think of this change.

DID THIS MUSKRAT EAT HIMSELF TO DEATH?

But I was not left long in doubt, for in a few days a particularly large muskrat was seen leaving the stream, and in the bright sunlight it waddled up the trail toward the carrot patch, where he proceeded to pull up a carrot, and returned to the water. Considering this a good opportunity for a daylight picture, I went to the cabin for the camera, and, returning, seated myself within a few yards of the trail, with a carrot placed temptingly in the way. After waiting, and when no animal appeared, I examined the carrot patch and found that he had come while I was after the camera.

The guide thereupon got a broom for

Photo by George Shiras, 3rd

WINTER MUSKRAT HOUSE ON THE RIVER BANK HELD SECURELY IN PLACE BY THE BUNCH OF ALDERS

Note the carrot dangling just above the muskrat. Flashlight (see page 785)

the purpose of driving the muskrat out into an open space where it could be photographed to better advantage—a proceeding it resented with some vigor by biting off the ends of the wisp (see page 780). In the effort to round him up he was upset, but he had become so fat and unwieldy that it took several trials to regain his footing. When right side up, with a gloved hand he was seized by the tail and held aloft while the camera snapped again (see page 781).

Replaced on the ground, he headed for the water, but on discovering the carrot in the trail, he seized it without signs of fear and dragged it down to the water's edge, where he disappeared under the dock. Late in the afternoon the flashlight was set upon the path near the water, and at dusk, just as the bait was being tied on, I saw the dim figure of the muskrat coming out of the creek and headed for the carrot; so, giving a warning cry, we rushed away just as the flash exploded (see page 782).

For many days thereafter this animal ate and dozed alternately in the carrot bed, and one evening I saw him at the edge of the bank with a large carrot, out of which he would take a bite and then his eyes would close; and then in a moment he would nibble again. He had now grown fatter than a woodchuck. The morning following this my attention was called to the animal's head sticking out from under the dock, and for the first time he did not seem to be interested in carrots. Examination showed him to be as dead as a mackerel, and his days of gluttony were over.

WINTER HOMES OF THE MUSKRAT

The time of year had come when the old and the young muskrats, lacking a warm home within reach of open or running waters, must provide a new one in

Photo by George Shiras, 3rd

AN EARLY WINTER VIEW OF THE SAME HOUSE, WITH THE MUSKRAT GETTING ITS FINAL CARROT (SEE TEXT, PAGES 784-785)

advance of the northern winter. About White Fish Lake most of these animals seemed to have quarters habitable throughout the year, but about 10 per cent built the usual dome of reeds and mud in the marshes at the inlet and outlet of the lake, where the running waters prevented ice forming to the bottom, while another 10 per cent erected a substantial upper-story over their summer homes in the river bank. Night views of these different structures appear on pages 783 and 784.

Early in November, before ice formed on the stream, a final flashlight picture was taken of a muskrat climbing his snow-covered house for a farewell bite at a carrot, the welcome odor of which had penetrated the cozy home and given notice that the prospective meal would be illuminated by a burst of light, affecting his vision for the moment, but not his appetite.

MOTHER MUSKRAT CHASES A MINK

Once while watching for deer from a tree overhanging the water, I saw five young muskrats sunning themselves on a near-by log, while the mother swam about in a watchful way. Suddenly she gave a squeak and a flap of her tail; whereupon the youngsters tumbled off into the water and, diving, disappeared in the hollow end of the log, followed by the parent. Looking about for the cause of alarm, I saw a good-sized mink peering through the brush where the inner end of the log was embedded in the bank. Satisfied that the only chance for an immediate meal lay in submarine operations and possibly not knowing a protector was at home, the mink glided into the water and, without a moment's hesitation, dived out of sight at the entrance to the log, leaving me in the belief that the purpose of such a bold marauder would soon be accomplished.

Photo by George Shiras, 3rd

A MICHIGAN MINK FINDS A FRESH FISH ON SHORE AND RECEIVES A SURPRISE (SEE PAGE 787)

Consequently I was much surprised on seeing the mink shoot to the surface and put for the shore just as the mother came in sight in angry pursuit. On landing the mink ran into an opening in the trunk of the tree upon which I sat, followed by the muskrat; but no encounter occurred, for the mink came out the other side and in a quick dash re-entered the first hole. Several times this maneuver was repeated, the muskrat becoming more and more infuriated; but the mink seemed to regard the whole affair as a joke, finally running up the bank, while its antagonist, taking no chances on being lured away, sat on the shore for half an hour.

The week following I saw three young muskrats on the log, and this reduction in number doubtless meant a successful

raid while the mother was out of sight in search of food. Whether fear, gallantry, or a provident instinct in not killing the breeding female accounted for the mink's refusal to give battle, I will not undertake to say. And possibly it was this particular mink that had an encounter which it did not regard as a joke, as shown on page 786, where a mink, near the muskrat log, is pictured pulling on the fish bait just as the flash exploded.

RABBITS OF THE NORTH

The varying hare or snow-shoe rabbit does not occupy a burrow, and although it remains throughout the year above ground it is seldom seen, even where fairly numerous; for, besides living in dense swamps and thick coverts, it is largely nocturnal. I have sometimes come across the remnants left by an owl or a fox, and have often seen hundreds of tracks in a freshly fallen snow, besides on occasions snaring some for camp use, but rarely have I seen their brown forms in summer or when whitened on the approach of the winter snows. The fact that this rabbit was difficult to photograph and, moreover, was typical of the northern swamps, being a staple winter diet of the trapper, homesteader, explorer, and of many Indian tribes, led me to try for a series of pictures, even if such a humble and timid animal was not rated high on the sportsman's list.

In the near-by swamps and in the alders along the creek in front of my Michigan camp, there were supposed to be a number of rabbits; so a preliminary feast of carrots and cabbage was placed 100 yards down the stream, such proximity being an advantage in resetting the camera and flash whenever we saw the blaze or heard the report, for if the rabbits proved as indifferent to the flashlight as coons, skunks, and muskrats, it would then be possible to get two or more pictures each night.

In a few nights the vegetables were gone. Then a carrot was tied to the end of a string connected with the flashlight; but no explosion occurred the first night, because the rabbit had quietly eaten the bait without pulling on the string. Then a carrot was suspended from the ground on the trunk of a tree, requiring the animal to stand up and pull; but this made a somewhat ridiculous position, since one is not accustomed to seeing a rabbit brace its forefeet and pull for dear life.

Then a tilting board was arranged, so that when the animal stepped on it the flash would be discharged; but a few experiments showed that the visitor always seemed to come with a hop and a jump—whether of joy or suspicion I could not tell. This resulted in the animal moving during the flash or being out of focus when on the jump.

Finally, a spring pole was bent down to within a foot of the ground and a carrot tied to the end of it and to a stake driven level with the soil, so that when the carrot was eaten through the pole would fly up, pulling the string connected with the flash. One can see or imagine he sees a surprised look on the face of the rabbit as the half-eaten carrot springs into the air (see page 789).

When the fall winds from Lake Superior carried the first snowflakes, and it seemed probable the rabbits had changed from brown to white, the camera and flash were set out again. But a week passed before a visitor came, for upon the alders losing their leaves the summer wanderers had retreated to the cedar swamps. One scene, on page 791, depicts a pair, partially robed in white, nibbling at the last supper of the year, furnished from the garden of the author's camp (1912).

NORTHERN SKUNKS UNDER THE FLASHLIGHT

During the fall of 1911 I spent 10 days at my house-boat on White Fish Lake, and, as was the custom, some fish and the remains from the camp table were placed a few yards back in the forest for the enticement of any wandering animal. It was in this way and in the same locality that I got my first series of coon pictures by flashlight. The second night following a visitor came and the food selected suggested a coon or a

Photo by George Shiras, 3rd

A MICHIGAN VARYING HARE, OR SNOW-SHOE RABBIT, FIRES THE FLASH

"The fact that this rabbit was difficult to photograph and, moreover, was typical of the northern swamps, being a staple winter diet of the trapper, homesteader, explorer, and of many Indian tribes, led me to try for a series of pictures, even if such a humble and timid animal was not rated high on the sportsman's list" (see text, page 787).

skunk. I then put up a light-colored plank for a background and hung the bait from it, so that the animal was sure to be in focus and its figure well outlined against the board, however dark the fur. Then at dusk the camera and flashlight were set within a dozen feet of the bait.

After dinner I sat on deck awaiting results, and about 8 o'clock I gave an involuntary start, when the bright flame and heavy report broke in on the quiet, dark waters of the little bay. But, whatever the animal, it had quietly disappeared before I came ashore with the lantern to reset the camera and the flash for another trial. Several hours later the house-boat quivered from the shock of another explosion, but I did not get up, wishing to see what the developed plates would show the next day before trying again. The first exposure was that of an adult skunk pulling sidewise at the bait, and marked with the usual dorsal strip of white and a tail of black tipped with white (see page 792). The second plate showed a skunk with a darker body and a tail almost entirely white (see page 793).

The next night it rained constantly and nothing came, for skunks dislike wet grass or dripping bushes. On the third night three flashes were fired before 11 o'clock, and the plates showed the skunk with the white-tipped tail; and this one continued to come night after night to brave the terrors of the flash. Finally, the white-tailed skunk summoned up courage for a second visit, and then came regularly. Up to this time no picture had shown the great plume-like tail of the skunk when erected for action.

But the second skunk had evidently discovered that every time it pulled on

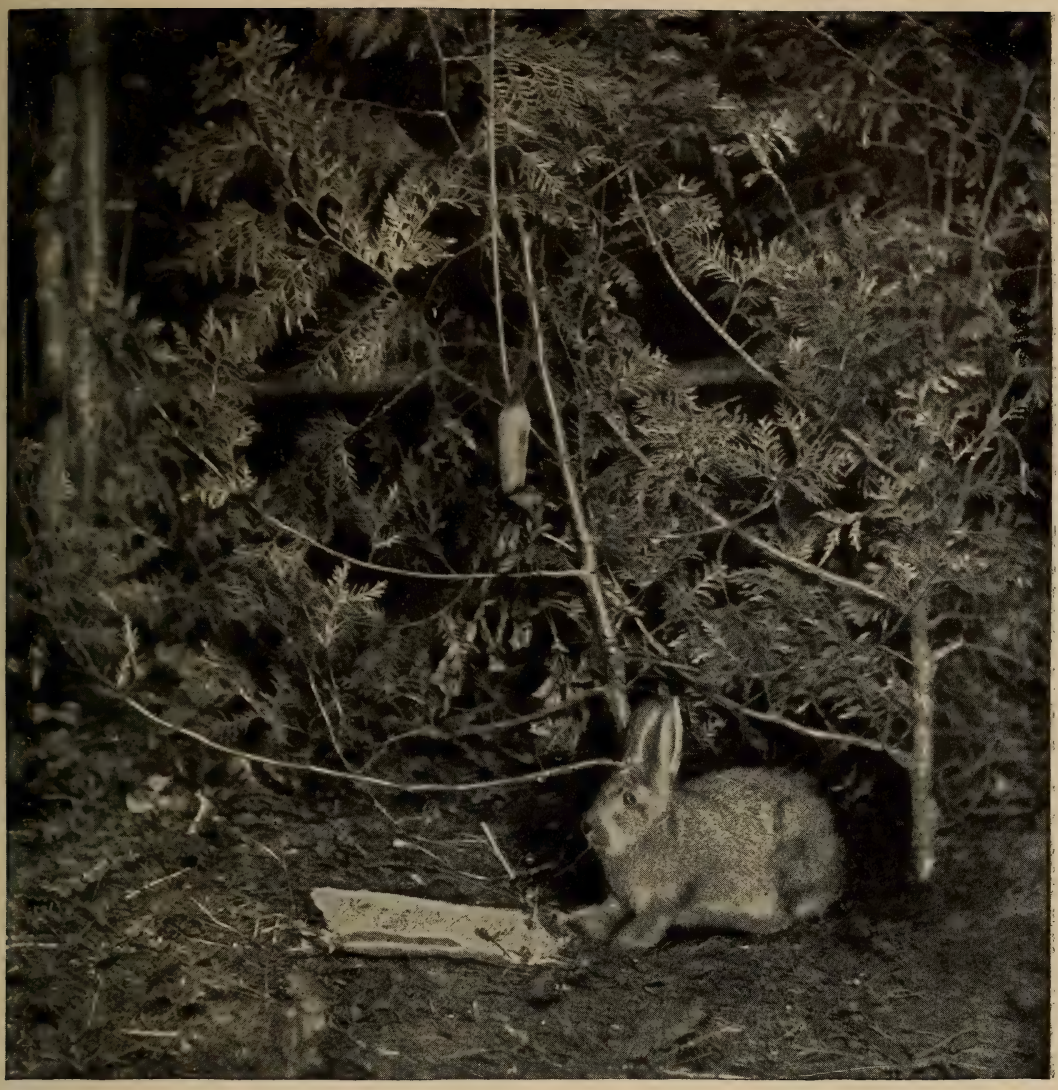

Photo by George Shiras, 3rd

MANY EXPERIMENTS WERE TRIED BEFORE A PHOTOGRAPH SHOWING A RABBIT IN A NATURAL POSITION WAS SECURED

"Finally a spring pole was bent down to within a foot of the ground and a carrot tied to the end of it and to a stake driven level with the soil, so that when the carrot was eaten through the pole would fly up, pulling the string connected with the flash. One can see, or imagine he sees, a surprised look on the face of the rabbit as the half-eaten carrot springs into the air" (see text, page 787).

the bait attached to the string there followed a dazzling light and a heavy explosion. Not liking this kind of interruption, it always raised the tail so the battery concealed beneath would be ready for instant use if the occasion required (see page 794).

Should one wish to compare the markings and the habitat surroundings of this and the southern species, two pictures of the Florida skunk will be found on pages 812 and 813.

PHOTOGRAPHING SKUNKS AT THE CABIN DOOR

Late last summer when taking night pictures of coons in the patch of corn adjoining my Michigan cabin, a developed

Photo by George Shiras, 3rd

THE FLASH SECURES A PAIR OF RABBITS AT BAIT IN THEIR BROWN, SUMMER COATS

negative unexpectedly showed a skunk pulling on a husked ear of corn that had been used as bait (see page 795). Thereafter the coons disappeared, whether because the supply of corn had about given out, or because the combined presence of skunks and the flashlight proved too much for their constitution, I could not tell. The next afternoon, hearing a noise under the dark-room floor, I examined the outer wall where a drain-pipe passed through, and there was a fresh tunnel in the sand, showing that a skunk had selected his winter quarters. The same night a camera and flashlight apparatus faced the opening, while a string with a piece of bacon dangled from the wall.

At dinner every one jumped at the near-by explosion. When, a few minutes later, the negative was in the developer, and the image of not one but two skunks began to appear, I could hear the animals moving about almost under my feet. To have thus taken a picture of wild animals within three feet of the dark-room and then developed the plate in even closer proximity to the living forms represents an occurrence never likely to be repeated (see page 796).

On leaving camp shortly thereafter, orders were given to the care-taker to trap these undesirable tenants, and as I write perhaps some furrier is now busily engaged in converting their humble pelts into furs designated by such high-sounding names as black fox or Alaska sable. The experiences of past years, narrated hereafter, compelled such summary disposal of animals usually unobjectionable except when claiming a joint tenancy in the abode of man.

SOME ADVENTURES WITH SKUNKS

Just as a coon once, in a single night, killed all the young chickens raised for camp use, on another occasion the dead bodies of 48 half-grown chickens were found on the floor of the poultry-house, each with its throat pierced by a single incision of sharp teeth and hardly a feather ruffled, since the animal was satisfied with a few drops of blood sucked from the throat of each.

Setting the trap the next night, a half-grown skunk was caught, whose beady little eyes and shrinking body made a picture of despair. But such wholesale murder forbade clemency.*

While the skunk will usually depart at the sight of man, they are often set in their ways, when traveling a narrow path refusing to yield the right of way to one coming from an opposite direction.

* It may be stated here that there is a short period, following the withdrawal of maternal care, when the young chickens of all the broods flock together at night before they have learned to roost off the ground, and then a visit of a predatory animal is apt to be disastrous. I have often felt, however, that it is the younger of the carnivorous animals, like the youth of mankind, which are often reckless in the enjoyment of unusual opportunities.

Photo by George Shiras, 3rd

NOVEMBER FLASHLIGHT OF A PAIR OF SNOW-SHOE RABBITS IN THEIR WHITE, WINTER ROBES (SEE TEXT, PAGE 787)

One evening, many years ago, while hunting deer, I was returning to camp along a railroad track where it crossed a broad, wet swamp. The road-bed had been raised above the low ground by earth taken from both sides, so that the single track was hemmed in by broad ditches filled with water. Half way across I noticed a large skunk coming toward me, and the idea of a head-on collision was not pleasant; but shooing and shouting had no effect, and on he came. At 20 feet he raised slightly to inspect me, when I tried to put a rifle ball through his head—about the only shot that will paralyze an intentional or reflex action of the scent glands. The shot missed, seemingly encouraging his desire to continue up the track; so the next ball went through the body, and some minutes elapsed before I attempted to pick a way over this odoriferous spot.

By a coincidence, several seasons later and in the same locality, there occurred another adventure with an even more tragic ending.

Behind a ridge of sand, out of sight of the railroad track, and where a big fallen pine made a permanent back-log for the fire, was a favorite camping site, and here one night we heard a rattling of tin cans behind the tent. One of the guides, lighting a lantern, went back to investigate. We were somewhat surprised to hear him say, "Come here, boys, if you want to see a new variety of canned goods." Leaving the camp-fire, we saw a large tomato can mysteriously coming toward us through the grass, the result of a skunk investigating the interior of an empty can and being unable to withdraw its head, was trying to go home blindfolded. Passing the side of the tent he began climbing up the bank at the end of the back-log, but no sooner did he feel the bark beneath his feet than he turned down the log toward the fire, which was sending its ruddy flames many feet over the top of the log. Shouting to turn him back, and this failing, all retreated as he approached the blaze. Then came a puff of smoke from the singed and sizzling fur, and the poor animal toppled over into the coals below.

Photo by George Shiras, 3rd

THE FIRST SKUNK THAT VISITED OUR CAMP AND TOOK ITS OWN PICTURE (SEE PAGE 788)

See adventures with skunks, pages 790–795

As might be expected, his plight was made known by an odor that quite filled the atmosphere. Protected from inhaling the flames, he managed to reach the tent, when a desire to put an end to such suffering and at the same time save a portion of our outfit led one of us to seize a rifle, with which he was despatched. And then the charred body was interred, can and all.

Except when defending itself against a recognized aggressor or in a final death struggle, a skunk will seldom use his weapon indiscriminately, even though suffering great pain. Of the many dozens trapped about my Michigan cabin, none have signalized their capture by the slightest odor, even though hours or an entire night might pass with a foot in the clutch of a steel trap.

A simple and effective method of safely killing these trapped animals was used at my cabin for many years. A 5-foot chain connected the trap to a long pole, the latter acting as a drag, and when it became necessary to kill and remove the animal from the trap the pole was used to safely drag the skunk down to the little bridge spanning the near-by creek, where, like a giant fishing-rod, the pole, chain, and trap were swung over the water and lowered, the weight of the trap sinking the animal beneath the surface, the carcass being easily removed a few minutes later. Never in dragging the struggling animal to the water did it discharge the fetid matter, evidently because its captor was well out of range through the use of the dragging pole.

Another method of practical value in permanently driving such animals away from one's camp or cabin without running the usual risk when shooting them was brought to my attention while camping south of Lake Superior in 1883. On this occasion a skunk was discovered busily employed eating our small collection of eggs in the provision tent. Shouting or rattling the canvas had but a momentary effect, for every few minutes another egg was pulled out of the box and eaten with great relish. The colored cook was in a frenzy of indignation, favoring drastic action, but the rest of us

Photo by George Shiras, 3rd

THE WHITE-TAIL SKUNK WHICH VISITED OUR CAMP ON THE SAME NIGHT (SEE PAGE 788)

A series of ten pictures of skunks were taken in a week (see adventures with skunks, pages 790–795)

felt that this might result in the loss of all the other supplies. Just then our Indian guide, Dan, returned from the landing, where he had been cleaning trout, and without a moment's hesitation he went to the camp-fire, scooped out a full dipper of boiling water, and approached the little tent with the evident purpose of scalding the trespasser.

Then a greater consternation seized us, for it seemed highly probable that not only the tent and its contents would be lost, but the animal would soon be in our midst, anxious to retaliate with a fluid worse than that with which he was assailed. Dan, seeing our fear, said: "Don't be scared; he won't even raise his tail when I swat him." This Indian had been a trapper from boyhood, and as he was one of a few of his kind, I had confidence in him regarding animal life; so he was allowed to proceed. The instant the steaming water struck, the skunk abjectly hurried from the tent and disappeared in the brush. The next day the same method was tried on another one feeding behind a log on bacon rind, and, like the other, he immediately left without causing trouble.

The following season the colored cook was employed at a fishing club on Lake Superior, where he was greatly annoyed by a large number of skunks coming about the kitchen after sundown. Recalling the successful dispersal of these creatures the year before, he devoted many evenings to pouring the contents of the camp kettle on them as they assembled below the porch at the garbage can, and in no instance did any of these animals offensively resent the scalding. Later he reported that occasionally bald-headed skunks were seen eyeing the cabin from a distance; but the kettle proved mightier than the garbage can.

That a skunk when suddenly injured, but suspecting an unseen foe, will sometimes fire a broadside in hope of relief may be shown by another incident. Camping one stormy night in an aban-

Photo by George Shiras, 3rd

THE DANGER SIGNAL FOR PERSONS TO KEEP AT A DISTANCE: THE SKUNK SPREADS ITS PLUME-LIKE TAIL IN ANTICIPATION OF THE EXPLODING FLASH

"The second skunk had evidently discovered that every time it pulled on the bait attached to the string there followed a dazzling light and a heavy explosion. Not liking this kind of interruption, it always raised the tail, so the battery concealed beneath would be ready for instant use if the occasion required" (see page 789). "Except when defending itself against a recognized aggressor or in a final death struggle, a skunk will seldom use his weapon indiscriminately, even though suffering great pain" (see page 792).

doned cabin near a trout stream, we were astonished at a fly-rod standing in the corner dropping to the floor, while the reel buzzed vigorously. The owner of this particular rod, desiring to save the fast-disappearing line, placed his foot thereon, and a moment later there arose through the cracks of the shrunken floor a terrific odor of the hooked victim, struggling a few feet below. This occurred in the days when it was not considered unsportsmanlike to add an angleworm to the fly-hook, so when the slack line slipped through the floor the skunk undoubtedly regarded the suspended bait as a small but choice morsel. Cutting the line did not appease the animal, and until midnight most of us remained outside in a pouring rain, awaiting the smoke of battle to clear away.

Still another case of eviction took place where the usual method of resentment had possibly a more subtle meaning. In clearing a lake near the camp of pickerel, in order to replace the same later with black bass, the useful disposal of the captured pickerel became a problem. When it was suggested that one or two fish be put in each potato hill as a fertilizer, the idea seemed a good one. On the night following every hill thus selected had been pulled to pieces

Photo by George Shiras, 3rd

A FLASHLIGHT SET FOR COONS IN A CORN PATCH IS FIRED BY A SKUNK, SHOWING THAT THEY EAT GREEN CORN; SQUASH WAS UNTOUCHED BY EITHER ANIMAL

"Cutting the line did not appease the animal, and until midnight most of us remained outside in a pouring rain, awaiting the smoke of battle to clear away" (see some adventures with skunks, text, page 794).

and the small potatoes scattered about. Skunk tracks told the story of our misdirected effort at conservation. In the evening a trap was placed near by with a fish hanging over it, and in the morning sunlight we found a big, fat skunk, with both feet pinioned by the steel jaws. The usual baptism in the creek followed, and by way of a warning and retribution the body was placed in another potato hill.

The next morning this hill had disappeared, while the body of the skunk was found caught sidewise in a hole beneath the cabin, showing an endeavor on the part of his comrades to carry him from the field of death. In order to get additional evidence on this point, the body was again placed in another potato hill. The camp cook remonstrated, with the remark that at this rate we would be "sure skunked on a potato crop." During the evening a tugging was heard at the edge of the cabin, and later the rubbing backs of the animals indicated that they were pulling the body well under the floor and all uttering a chorus of whining notes. Soon significant glances were exchanged, for from below came the well-known scent, and in a few minutes the several rooms were wholly uninhabitable and we fled to a brush lean-to some yards away. An hour later it was recalled that the four-foot cellar, loosely boarded up to keep the soil from caving in, contained all our meat and perishable food, and that it was in the center of the danger zone. But so thoroughly impregnated had everything become that, lacking food and comfortable shelter, the next day the entire party sadly returned to town.

Whether this proceeding was a wake, followed by a ceremonial salute over the grave, or was a premeditated attack upon

Photo by George Shiras, 3rd

A PAIR OF SKUNKS PHOTOGRAPHED BY SET FLASHLIGHT AT EDGE OF THE AUTHOR'S DARK ROOM: 1912

Plate developed while the animals were beneath the cabin floor (see page 790)

the occupants above, must be left to the readers for determination.

THE MICHIGAN BEAVER, PAST AND PRESENT

During my earlier visits to the south shore of Lake Superior beaver were abundant, and while seldom seen in daytime the fresh cutting and their slides, lodges, and dams indicated a wide distribution. After 1885 their decrease in numbers became marked, so that between 1890 and 1900 I saw only two, each living a hermit life in a river bank, and neither daring to build a lodge or even provide an adequate supply of bark in the pools close to the under-water tunnels. Such was the situation when the legislature passed a belated act closing the season on beaver for a number of years. Gradually a recovery was noted, and, odd as it may first appear, most of the new homes were close to rural habitations or not far from well-used highways, because in such places the professional trapper had no line of traps or feared to poach, knowing the interest aroused in an animal almost unknown to the later generation of settlers. Today the upper peninsula of Michigan, like many other portions of the northern country, contains more beaver food and a larger area suitable for their habitations than in the days of the primeval forest or before the white man came. Originally every stream, pond, and lake was fringed with a heavy growth of coniferous trees, none of which had edible bark, and it took the beaver countless years to flood out and destroy such forests, when with the appearance of meadows came succulent roots and a variety of mixed hardwoods. On the advent of the lumbermen millions of acres of pine, hemlock, and cedar went down before the axe, which was followed usually by

Photo by George Shiras, 3rd

COONS AGAIN INVADE WHITEFISH LAKE

With the development of agricultural districts the coon is taking up a permanent abode along the south shore of Lake Superior. Last August (1912) the camp corn patch was raided and in three nights most of the small crop was eaten by coons.

fires. The succeeding second growth consisted of poplar, cherry, black ash, birch, and willow, all massed and of small diameter, at the edge of these water-courses. It is in this territory that the beaver now seeks to establish his home and where the commercial value of the trees is least important.

Through the complaint of a few lumbermen, echoed and re-echoed by designing trappers, both the damage and the abundance of the beaver has been greatly exaggerated, resulting in an open season on January 1 of the present year. Fully two-thirds of the area suitable for beaver now contains none. Instead of allowing the trapping out of the beaver concentrated in their new settlements and rendered incautious by reason of the previous closed season, it would have been the better part of wisdom for the State authorities to have caught and transported the surplus numbers to the hundreds of streams and ponds containing none.* Then, with an open season, the risk of a quick extermination would have been greatly lessened.

In October, 1912, I heard of a large beaver dam constructed during the summer about 30 miles northwest of Marquette and within two hours' ride by automobile. The lodge was approaching completion, and as I realized its future occupancy was likely to be of short duration, it seemed proper that the camera should take photographically what the steel trap would take physically in less than 90 days. On the afternoon of Oc-

*One game warden of Dickinson County reports 600 beaver taken in 90 days.

Photo by George Shiras, 3rd

COON'S FINAL MEAL

Whether the scarcity of the corn, the flashlight, or the sudden appearing of skunks drove the coons away, is uncertain (see page 790)

tober 7 a small tent was set up in a grove of poplars, where many white and tooth-scored trunks showed the recent work of the beaver. The dam had been completed months before, the lodge was about ready for use, and the animals were concerned with their final labor in storing away in the deeper waters near their home an ample supply of poplar and birch.

My plan of operations, decided upon in advance, combined two distinct methods of getting a picture, and neither available on the same night; so it meant camping two days in this little valley. My first scheme was to set up the cameras and the flashlight apparatus opposite the lodge, with the expectation that when a beaver clambered out of the water for the purpose of plastering mud on the side of his house the string placed at the edge of the water would be touched and the flash fired. On page 801 appears the photographic outfit, placed 12 feet in front of the beaver house.

The second plan for the succeeding night consisted in making a small breach in the dam, so when one of the old beav-

Photo by George Shiras, 3rd

NIGHT PICTURE AT THE EDGE OF A SWAMP

When the coons deserted the corn patch, one was photographed at night where he had discovered the piece of bait put out for mink. Note the hand-like paw of the coon

ers discovered by the receding water that repairs were needed at some point in the reservoir walls, the one attempting this work would come in contact with the string and furnish the second picture I was after.

The first night my guide and I were in the sleeping bags at dusk, for a heavy frost was threatening and no blazing fire could be permitted in this locality. An hour later came the flap of a beaver's tail down by the lodge and repeated frequently thereafter, indicating that a trace of scent or the dark-green camera boxes were exciting alarm. No welcome explosion was heard during the night, and in the morning I found that the animals had spent the time towing in an additional supply of bark. Whether the house was entirely completed or work thereon had been suspended for awhile I could not tell.

Photo by George Shiras, 3rd

PHOTOGRAPH OF A FLASHLIGHT SCENE

In order to show what a flashlight scene looks like, the author placed a camera, facing the flashlight, with the object to be photographed between the camera and the flashlight. The great, white ball of light to the left is the exploding powder, while the coon, silhouetted against the light, is seen pulling on the string.

During the day not a beaver was seen, but late in the afternoon a pair of muskrats was busily engaged at work near the edge of the overflowed meadow erecting their smaller home, thus showing a keen appreciation of the slack water afforded by the dam built by their larger kin. Before dark the water had fallen six inches below the rim of the dam, and this, I felt sure, would be sufficient notice to the watchful beaver.

Across the break in the dam I placed a birch branch, tying the flashlight string to it, with the idea that the beaver, after an inspection of the damaged part, would pull the branch aside on beginning the repairs, and thus fire the flash.

It was not until after midnight that I saw a faint flutter of light on the white canvas roof, followed almost immediately by the boom of the flashlight. In the morning it was found that a beaver had cut the birch branch in two, and while pushing one piece aside the flash was discharged. This discouraged further efforts, and the beaver retired to his wigwam to report an extraordinary condition of affairs both at the dam and on shore.

But not all such pictures are successful, for there are several complications in night photography which may rob one of his pictured game. With great care the negative was developed, and there, in the center of the plate, appeared the sturdy figure of the beaver, its coat glistening in the brilliant artificial light, while the clear waters of the meadow stream permitted the lens to show the flattened tail beneath the surface of this woodland pool (see page 803).

BIRDS WILL TAKE THEIR OWN PICTURES

Most birds are photographed about their nests, or in the great rookeries and breeding resorts of the sea-coast and inland waters, when the domestic duties of the parents or when the fearlessness

Photo by George Shiras, 3rd

A MICHIGAN BEAVER HOUSE

This house was a great dome, 9 feet in diameter and 5 feet high, composed of twigs and branches, the interstices filled with mud or clay and the center hollowed out into a commodious bed-room having two under-water exits to the pond. The two cameras and flashlight apparatus were placed at the edge of the bank and the pulling string ran to a portion of the house where apparently it was unfinished (see page 798).

manifested by many birds under colonization makes such photography pleasant and generally successful.

But there are times of the year and localities, as well as different birds, where an approach is difficult. Often a good method of getting birds singly or in flocks is the set camera.

Some years ago I tried to get a group picture of comparatively tame buzzards and vultures which daily circled about my southern cottage; but even when I was in a well-concealed retreat these keen-eyed birds knew of my presence and would not alight in the vicinity of the bait. After an hour's wait I set out a smaller camera, covered with palmetto leaves, within 10 feet of the meat, and tying a piece of this to a string, I withdrew. Returning in half an hour, the bait was all gone and the pulling string in a hopeless tangle. The group obtained included both the black vulture and the turkey-buzzard (see page 804).

Almost any bird of prey, like the hawk, owl, eagle, or condor, will pull energetically on the string; but in the case of smaller or more timid birds it is advisable to use an auxiliary spring trigger, or even a common mouse-trap will do, since the release of the wire collar to which the string may be attached only requires the slightest pressure.

Pictures of birds nesting on sea beaches, in open marshes, or the tundra, where the use of a blind is difficult, may be obtained by concealing the camera in rocks, sea-weed, or marsh vegetation. By stretching a thread taut across the nest, the brooding bird on re-entering will release the shutter. It is usually best to make the screen for the camera a day in advance, so as not to imperil the fertility of the eggs or the life of very young

A BEAVER DAM (SEE PAGES 797-800)

Photo by George Shiras, 3rd

This particular structure was 300 feet long, extending in broken curves across the valley and with a wall 5 feet high and 4 feet thick at the base. It was composed of brush and mud, with an unusually large number of heavy stones along the rim. During July, 1912, 35 feet of the dam were blown up by dynamite in order to harvest a hay crop in the meadow above. In less than five days the beavers had completely rebuilt the dam. In October, 1912, the author made the small break in the dam near the left bank, shown in this picture, so that when the beaver was warned by the receding water it would investigate the cause and set off the flash. In daylight the

Photo by George Shiras, 3rd

THE BEAVER TAKES ITS OWN PICTURE AT NIGHT

About midnight a beaver came to learn the cause of the fall in the water. When he pulled aside the branch to which the flashlight string was attached and which had been placed in the break for that purpose, the flash was exploded and the record made (see page 800)

Photo by George Shiras, 3rd

BIRDS CAN ALSO TAKE THEIR OWN PICTURES (SEE PAGE 801)

After trying vainly for more than an hour to photograph comparatively tame buzzards and vultures, the author abandoned the blind behind which he had been concealed and set out the automatic camera with string and bait. On returning in about half an hour, he found the bait gone, and the development of the plate some hours later revealed the above picture of a black Florida vulture and tame buzzards.

birds, for strong sunlight or chilling wind are equally fatal. In this way I secured a series of snipe pictures on the eastern shore of Virginia otherwise unobtainable.

Having for several seasons scattered grain about an orange grove to attract local birds more regularly, I took a few of their pictures with the automatic camera, the focal plane shutter being set at 1/400 of a second. For the quail and ground doves (see page 806) I used grains of wheat and sunflower seed strung on a thread.

Finally several gray squirrels discovered this feeding place; so corn and nuts were substituted, the loose end of the string being just long enough to permit the squirrel to rise on its quarters—the most graceful and characteristic pose of this animal (see page 810).

PHOTOGRAPHING WILD ANIMALS OF THE RURAL DISTRICTS

I think very few persons suspect the abundance of night-loving animals in the vicinity of country homes, where there is a dense thicket, a swamp, or a rocky ravine. There may be found a burrow, a cleft in the rocks, or a hollow tree affording safe refuge to many an animal that seldom makes its presence known to the throng that daily passes.

Here, hidden away until the midnight hour, is the raccoon, opossum, skunk, weasel, or the rabbit.

Just by way of proof for any one that doubted this, I have set out every winter for several years past a camera and flashlight in the town of Ormond Beach, Florida, within 100 yards of a dozen cottages and a great winter hotel harboring a thousand guests and employés. Nearly every night came the burst of brilliant light betwixt an orange grove and a thicket, with an explosion audible to all awake, and each morning thereafter it became the custom to hear the oft-repeated inquiry, "Well, what did you get last night"?

During 33 nights in 1913 the nega-

Photo by George Shiras, 3rd

TWO GROUND DOVES AT THE BAIT, WHILE A MALE CARDINAL LOOKS ON

tives showed 12 skunks, nine of which were of different markings; four coons, three opossums, one cat, one pointer dog, two rabbits, and four wood-rats; yet neither the visitors, natives, nor caretakers in this vicinity ever encountered any of these animals, and only the roar of the flashlight and the ever-increasing pictures carried conviction. Some of these animals are shown on pages 807, 808, 809, 811, 812, and 813. The year before the result was the same, except for a greater preponderance of coons and a picture of a land turtle.

While this article deals primarily with mammals, it may be noted that alligators, crocodiles, snakes, and turtles may be taken in the daytime and sometimes at night with the set camera. A string, baited or unbaited, across the basking spot of such reptiles will insure a daylight picture, when the sun is high and the shutter set at its fastest speed; while at night, when the alligators and crocodiles roam the murky waters, a piece of bloody meat or fresh fish will attract them on to the bank or sand-bar.

There is a very abundant land turtle of the South, known locally as the "gopher," which lives in a burrow and seldom appears during the day. Last year I found one of their holes within a few feet of the spot where bait had been placed for coons. This turtle, even in the extreme South, often hibernates during the so-called winter months, when fresh vegetation is at a low ebb. It was not until the middle of March that fresh tracks in the soft sand at the entrance of the burrow showed the occupant was once more abroad. A thread across the entrance blocked its egress and on the following night the explosion was heard. The picture on page 814 shows the clumsy animal trying to push its way out, but the flash sent it deep down into its hole for another week, when a second picture was taken, and again it retreated for so long a time that the camera was removed.

Flashlight portraiture evidently does not meet with the approval of some turtles.

UNBIDDEN GUESTS

Just as the fisherman complains of the shark taking the hook intended for an edible fish, or the trapper of a wolverine pilfering his bait, so the camera-hunter often finds the string broken or the bait taken by some unwelcome visitor.

Cameras placed where cattle, sheep, and hogs range will be sprung by these wandering animals. One night a notoriously ill-natured bull, belonging to a Finnish settler, swished his tail unconcernedly against the flashlight cartridge and got a dose of flame and fumes that made his bellows audible several miles. On a trip up the Tamesi River, in eastern Mexico, I tried for a week to get pictures of ocelot and the jaguar, but

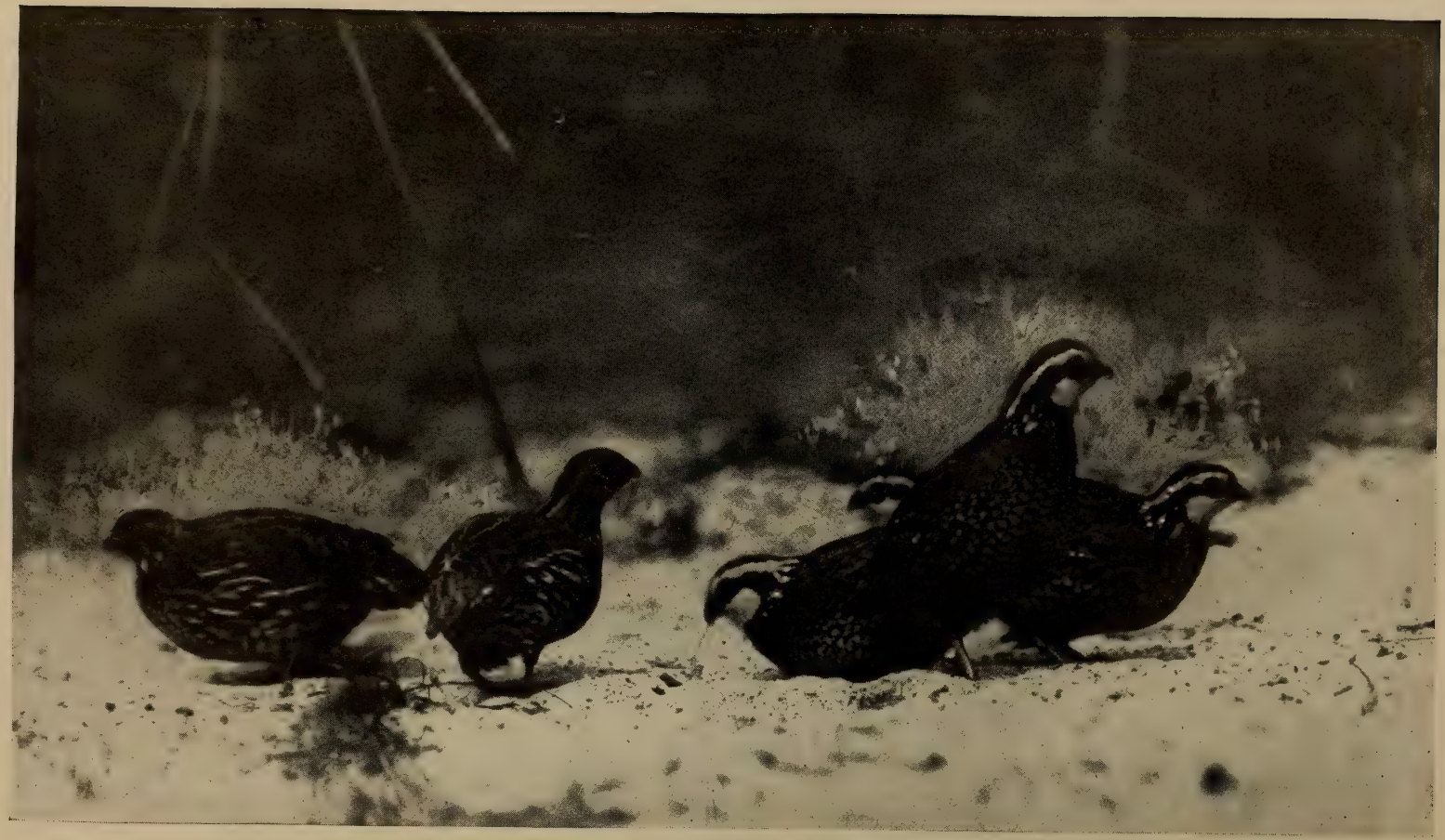

Photo by George Shiras, 3rd

FLORIDA QUAIL TAKE THEIR OWN PICTURES (SEE PAGE 804)

Unexpectedly a flock of seven quail discovered the seeds put out for smaller birds. Six pictures were taken by the author pulling the string and two the quail took during his absence. In the above group are four cocks and two females

Photo by George Shiras, 3rd

A TOM-CAT ON A HUNT FIRES FLASH SET FOR RABBITS, IN FLORIDA

No animals more destructive to birds and small game exist than stray cats, for they possess all the cunning of their wild ancestors and much more, acquired through domestication

early every night the flashlight was fired by several varieties of opossum, and it mattered not how high the bait was hung or its variation in kind.

While on St. Vincent Island, off the gulf coast of Florida, instead of coons I only got razor-back hogs, and on the main shore, on a rabbit runway, the flash was fired by a big tomcat seeking a bunny for his supper. During two trips after wild cats in a southern swamp hogs took the bait in the daytime and skunks the bait at night. Stray hounds hunting for pleasure and sledge dogs of the North, supporting themselves in summer, will eagerly follow up wind to the spot where the scented bait is in front of the camera, but, fortunately, these canines seldom return again after one bombardment of the flash.

But domestic animals are not the only source of trouble. In the wildest portion of Newfoundland a camera set in daytime, with a string across a trail used by caribou migrating in the fall, was walked into by a French trapper, who, on feeling the pressure of the string on his leg and hearing the click of the shutter, jumped back with a yell, thinking his life had only been saved because a set gun, the most diabolical device of the pot-hunter, had missed fire.

Again, a camera and flash set for deer and peccaries, on a supposedly disused trail at the edge of a Mexican sugar plantation, might have resulted in an international complication, because two Mexican girls, who walked into the string when groping their way to a canoe landing, thought they had been fired at from ambush by our party, camping near by, and fled shrieking through a jungle of palmetto and thorns to the nearest cabin, where the additional cries of the children and barking of the dogs made such an uproar that I was quite concerned.

My two estimable companions, Messrs.

Photo by George Shiras, 3rd

A FLORIDA RACCOON TAKING HIS OWN PICTURE

These animals feared neither the flashlight nor slumbering people when seeking a meal within an orange grove at Ormond Beach (see page 805)

Chapman and Fuertes, declared I ought now to appreciate their feelings every time they happened to approach camp at dusk, "with such infernal machines secreted anywhere and everywhere."

A few minutes later our host, an American planter, hearing the uproar, came along and, discovering the cause, shook me warmly by the hand, expressing a wish that I set out a lot more flashlight machines to scare off Indian and Mexican trespassers; so I became reconciled in thus having unexpectedly performed a service in his behalf.

Some of these unbidden guests are shown on pages 816 and 817.

MOUNTAIN MOOSE OF THE UPPER YELLOWSTONE

While endeavoring to visit and study the moose of the American continent throughout its several distinct ranges, I was informed that a small number of these animals were living near the very summit of the Rocky Mountains, and that one locality, where they had been seen in 1906, was about Bridger Lake, a few miles south of the southeast corner of Yellowstone Park, in the State of Wyoming. At this time I had only been able to locate one mounted head from the intermontane States and institutions, such as the National Museum, had neither skins, antlers, skeletons, or any data whatever bearing upon the number probably surviving in the Rocky Mountains south of Canada.

An examination of the map indicated several possible routes to the district in question: one by the way of eastern Wyoming and Thoroughfare Creek; another from Jacksons Hole through Two-ocean Pass; and a third by way of the National Park, and thence up the Upper Yellowstone River by pack-train or possibly by canoe (see map, page 818). Selecting the latter route as the most feasible for the heavy outfit necessary for

Photo by George Shiras, 3rd

VERY FEW PERSONS SUSPECT THE ABUNDANCE OF NIGHT-LOVING ANIMALS IN THE VICINITY OF COUNTRY HOMES

"I have set out every winter for several years past a camera and flashlight in the town of Ormond Beach, Florida, within 100 yards of a dozen cottages and a great winter hotel harboring a thousand people. During 33 nights the negatives showed 12 skunks, nine of which were of different markings; four coons, three opossums, one cat, one pointer dog, two rabbits, and four wood-rats; yet neither the visitors, natives, nor caretakers in this vicinity ever encountered any of these animals, and only the roar of the flashlight and the ever-increasing pictures carried conviction" (see text, pages 804 and 805).

my purposes, I entered the north end of the park in July, 1908, accompanied by my Michigan guide and another, then a resident of Montana. Wishing to avoid dependence upon a pack-train in the mountains and believing from inquiry that the Upper Yellowstone was navigable for a light boat in early summer, I brought along a large collapsible canvas canoe, capable of carrying three persons and more than a thousand-pound outfit.

Traversing the entire length of Yellowstone Lake in a gasoline launch, we entered the long southeast arm on the afternoon of July 23. Well within the entrance, a couple of low rocky islands shone white with breeding pelicans, gulls, and terns (see page 820). Heretofore no one seemed to know whether the white pelican bred on the lake or not, for, strange as it may seem, our launch was the first to enter the southern corner of the lake in more than ten years.

THE ALMOST UNKNOWN UPPER YELLOWSTONE VALLEY

During this and subsequent investigations the writer became and continues strong in the belief that the lower part of the lake and the valley of the Upper Yellowstone constitute one of the wildest and least frequented districts in the United States, especially when taking into consideration its accessibility, its wonderful beauty, and the entire absence of hunters, trappers, tourists, or camping parties of any kind. Yellowstone Lake is perhaps the largest body of fresh water at that altitude (7,741 feet) in the world; and while its northwestern

Photo by George Shiras, 3rd

A FLORIDA GRAY SQUIRREL PULLS ON THE NUT BAIT AT END OF STRING AND TAKES HIS OWN PICTURE IN THE DAYTIME

"Finally several gray squirrels discovered this feeding place; so corn and nuts were substituted, the loose end of the string being just long enough to permit the squirrel to rise on its quarters—the most graceful and characteristic pose of this animal" (see text, page 804).

shore is traversed each summer by more tourists than probably any other mountain lake, it has the much greater distinction of being less frequented at the lower end than any similarly attractive body of water. Such a condition is due to the park having been set aside in 1872, and with no big-game hunters coming over the mountains to the southern boundary, because the same game can be found lower down and because the State of Wyoming has lately turned the adjoining National forests into a perpetual refuge, and with no hunters passing either way through the valley, this area has lapsed into a perfectly untrodden wilderness.

An occasional government scout follows a blazed pony trail on the eastern foothills of the valley, but they remain mostly out of sight of the timbered bottom lands teeming with unseen and uncounted game.

As there are none of the more spectacular manifestations of nature so abundant elsewhere in the park, the inducement is lacking for diverting into this distant corner the great flood of tourists which annually sweeps in a circular journey in and out of the park.

Camping the first night in a little bay on a small promontory facing the broad delta of the Yellowstone, the canvas boat was set up and further strengthened by hardwood strips cut for the purpose. As the sun descended and the winds fell, hundreds of cow elk and calves sauntered down from the lower hills to feed on the swamp grass of the valley; but not an adult bull was seen then or during the entire trip, as they prefer to remain secluded in the highest timber during the midsummer period of horn growth.

In the morning a little time was lost trying to find the real mouth of the Yel-

Photo by George Shiras, 3rd

A FLORIDA OPOSSUM GRABS THE BAIT AND PHOTOGRAPHS HIMSELF (SEE PAGE 805)

This animal is the only American marsupial and, being very prolific, is abundant throughout its range, though seldom seen in the daytime

lowstone, since there were several side channels, deep bayous, and a couple of other streams entering the bay.

While thus paddling about we saw thousands of geese and ducks, mostly females with their broods, and all as wild and unapproachable as those in a less secure retreat; for migratory wild-fowl, shot at eight or nine months each year, do not lose their dread of man in the short nesting period, unless brought into continuous contact with those who cannot kill, as is the case in the many ponds alongside the park highways, where the birds sit preening themselves as the heavily laden coaches rattle by. With game animals the same is true, for those about the tourist hotels are frequently tamer than domestic stock, just as those in the more secluded parts of the park are the wildest of the wild.

On entering the river, the current, after a few miles, became much stronger than expected; and as, at best, a cumbersome

Photo by George Shiras, 3rd

AN ALMOST BLACK SKUNK WHO TOOK HIS OWN PICTURE AT THE SAME PLACE WHERE THE COONS (PAGES 808 AND 809), THE OPOSSUM (PAGE 811), AND THE CAT (PAGE 807) WERE ALSO PHOTOGRAPHED

canvas canoe is a poor craft for ascending swift streams, I soon saw that a mistake had been made in not bringing with us a long tracking line. However, with two paddles and a pair of oars, some progress could be made, our short line being sufficient for working around the more dangerous log-jams.

CHARGED BY A SILVER-TIP GRIZZLY

And now occurred an affair that shall be briefly described, there following a somewhat similar adventure later on more appropriate for this article.

While taking advantage, when stranded on a sand-bar, to look at a favorite crossing place for elk, I suddenly saw a large animal leap out of the bushes at the head of the bar and come down the river. It proved to be an immense silver-tip grizzly, and as he was fully 100 yards away none of us thought other than that he was badly frightened, probably by our scent circling in behind him. This belief was but momentary, for with head up and looking our way it was plain he intended visiting the stranded boat.

Beyond my exclamation, "Look ahead!" we were silent and motionless. When the bear was 40 yards away, I managed to get hold of a small revolver in a bag at my feet, and in desperation fired two shots over his head; but on he came, probably not hearing the slight crack of the smokeless powder. Aiming the third shot at his exposed chest when only a dozen yards away, a swirl of the heavy hair on the right showed the misdirected bullet had creased his side, and at the same instant the Montana guide, Farrell, gave one of his mountain war whoops and brandished an oar as threateningly as possible. The bear stopped, swung his big head from side to side, with his small eyes fixed for the first time intently on the boat, and then with a quick whirl, which sent the loose gravel in every direction, he put for the bank and

Photo by George Shiras, 3rd

FOURTEEN SKUNK PICTURES WERE OBTAINED BY THE SET CAMERA AND FLASHLIGHT IN TEN DAYS IN THE ORANGE GROVE AT ORMOND BEACH, FLORIDA

They showed nine differently marked skunks, ranging from an almost solid black (see page 812) to the almost white animal shown in this picture (see text, pages 804, 805)

into the heavy bushes at a gait that did our hearts good. While relieved by the sudden change in the situation, no time was lost shoving out into the deeper water and soon we were on the way again.

Undoubtedly there are many, in good faith or under the temptation of magnifying the perils of the wilderness, who would attribute a deliberate attempt on the part of this bear to kill us, from which he was only deterred by the apparently courageous reception. This, in the writer's judgment, was not the case at all. Both sides were equally frightened and both laboring under a misapprehension. This animal, with an unusual opportunity for catching calf elk when swimming the swift waters at the crossing, from his ambush on the bank heard a commotion down the river, and, with the notoriously poor eyesight of all bears, thought he saw in our brown, canvas-covered forms and the splashing paddles the game he sought, which was enough in a territory where man was unknown to bring him down at his best speed, the only thing that really counted in such a raid. Had he meant to harm us the sting of a pistol bullet and the accompanying demonstration would have had no effect beyond aggravation. That he had run into an unexpected gathering, and that it was purely "a case of mistaken identity," his hasty retreat sufficiently proves, were it not already known that the day has gone when any bear in any part of the United States will wantonly attack a man when unmolested.

At the next bend, however, as a matter of precaution, the axes were taken out from under the outfit, and also a heavy pole cut for "a crack on the nose," which, according to Farrell, an old-time bear hunter, was worth a dozen random rifle shots.

FIRST SIGNS OF MOOSE

With an increasing current and bad log-jams the speed of the boat became

Photo by George Shiras, 3rd

THE SLUGGISH LAND TURTLE, OR SOUTHERN "GOPHER," ALSO PHOTOGRAPHS ITSELF

After months of hibernation, this clumsy animal is coming out of its burrow fires the flashlight and then retreats for another week (see page 805)

Photo by George Shiras, 3rd

UNBIDDEN GUESTS: RAZOR-BACK HOGS FIRE THE FLASH

"Just as the fisherman complains of the shark taking the hook intended for an edible fish, or the trapper of a wolverine pilfering his bait, so the camera-hunter often finds the string broken or the bait taken by some unwelcome visitor" (see text, page 805). In this case the camera was set out at night for coons on St. Vincent Island, off the Gulf coast of Florida.

Photo by George Shiras, 3rd

ANOTHER UNBIDDEN GUEST: A CAMERA SET FOR DEER IN DAYTIME WAS SPRUNG BY A WANDERING PORCUPINE (SEE PAGE 805).

The author was unable to get ocelot and jaguar pictures because the opossum was abroad at dusk and took the bait before the more cautious animals appeared. In this picture the flashlight is reflected back in the opossum's left eye.

Photo by George Shiras, 3rd

ANOTHER UNBIDDEN GUEST: A MEXICAN OPOSSUM FIRES THE FLASH

Photo by George Shiras, 3rd

COW CARIBOU AND CALF: NEWFOUNDLAND

The camera was set with a string crossing the trail used by Newfoundland caribou in their fall migration. Several pictures were taken at this spot, the best of which appears above. It was here the French trapper sprung the camera and thought it was a set-gun.

Map prepared by R.H.Sargent.

Photo by George Shiras, 3rd

VIEW OF THE UPPER YELLOWSTONE RIVER

While high water made the trip difficult in July, 1908, low water in September, 1909 and 1910, was worse. Our canvas canoe had to be pulled up hundreds of such shallows. The author can find no record of a boat getting up to Bridger Lake, though, doubtless, Indians and trappers did so before 1870.

discouraging, so I got out to lighten the bow and to have a better opportunity of looking for animals or their tracks.

Almost at once I saw some moose tracks, and as I continued on hardly a mud flat was without them. At the time this was a surprise, for, according to the park authorities, there were not supposed to be above a dozen moose in the entire park. Seeing an opening in a near-by woods suggestive of a pond, and with water warm enough for aquatic vegetation, I approached cautiously and found just such a place, with a big, black-colored bull moose in the midst of a feast.

Heretofore I had made a rule not to photograph animals in public parks or game reservations of any kind, because the lack of skill made such a pastime as unattractive with camera as with the gun and because many of these animals have lost their wild characteristics. This wary and uncontaminated creature suggested, of course, an exception; but as it is always difficult to draw the line, I concluded that the park line should still be the one to go by. So, after noting the color and size of the animal and the shape of the antlers, I returned to the river, hopeful that after crossing the boundary the camera might have another chance at an animal supposedly rare in the mountain States.

The next afternoon I walked within 50 feet of a large bull lying half asleep at the tail end of a small island, and not until the canoe came in sight did he arise. Then another bull got up further back, and as they ran off were joined by a cow—one of the few instances in which I have seen the female consorting with bulls in midsummer.

Before reaching the lake on the return trip several days later I saw six more bulls and another cow, making a total of eleven along the swift, cold waters of the Yellowstone. Doubtless a visit to

Photo by George Shiras, 3rd

A BREEDING COLONY OF WHITE PELICANS IN YELLOWSTONE LAKE

Until the author entered the southeast arm of Yellowstone Lake in 1908, it was not known whether the pelican nested on the lake or not. From 800 to 1,000 adult birds were there each season. On an adjoining island were gulls and terns

Photo by George Shiras, 3rd

A TYPICAL VIEW OF THE UPPER YELLOWSTONE VALLEY, THE HOME OF PROBABLY 1,500 MOOSE

Beneath the ridge, on the opposite side, flow the swift, cold waters of the Yellowstone, while in the foreground is Trail Creek, with two young bull moose feeding close to a beaver house (in the left foreground). This valley, situated at an elevation of 8,000 feet, is hemmed in by steep ridges varying from 600 to 1,500 feet in height, except where drainage ravines cut back short distances. The floor of the valley is level, some 20 miles in length, with a width of from 1 to 4 miles, and dotted with heavy pine forests, meadows, willow thickets, and ponds. The delta at the lake end and the diverging valleys at the head waters in Wyoming are the widest places.

Photo by George Shiras, 3rd

BIG BULL MOOSE AND TWO CALVES AT A BEAVER POND IN THE UPPER YELLOWSTONE VALLEY

In the background is one of the heavy pine forests which harbor the moose during the winter, while the adjacent willow thickets provide nourishing bark after the coming of the deep snows, just as the warm waters of the numerous beaver ponds afford the choicest of summer food. The variegated horn growth is shown here, where in one bull are two of the three prevailing types, the left antler being round and long, like that of an elk's, while the right one is heavy and broadly palmated. This great collection of moose live continuously in the valley, seldom ascending

Photo by George Shiras, 3rd

MOOSE IN THE SOUTH ARM OF THE UPPER YELLOWSTONE

On the third trip to the Yellowstone Valley the author found the south arm of the lake to be the nursery of the calf moose. Twenty-one moose were seen in the shallow water at one time and several hundred about the shores during the trip. Picture shows cow moose and twin calves.

BULL, COW, AND CALF MOOSE

Photo by George Shiras, 3rd

There are dozens of ponds and beaver dams in the valley of the Yellowstone where the warm waters are favorable to the aquatic vegetation which the moose devours. About 1,500 moose are probably living in this the most populous moose country in America

Photo by George Shiras, 3rd

A COW MOOSE TAKES ITS OWN PICTURE AT NIGHT

Unlike the elk and caribou, the moose are great night feeders. This picture was taken where a moose trail led from the forest to a number of ponds

some of the small ponds and lakes in the valley, where summer food abounded, would have shown many more. Yet this area did not extend more than 8 miles in a direct line, although by reason of its circuitous course it was probably 16 miles by river.

On the third day our ascent was definitely ended by the breaking of both oars, and although spliced with copper wire they became useless in combatting the heavy currents at every turn of the river. At this season the warm weather was melting the last of the snow-drifts on the higher summits, and while the high water was favorable for reaching Bridger Lake, the current proved too strong for our outfit. In the succeeding and later seasons low water became equally trying.

But the existence and comparative abundance of moose in this isolated valley was now no longer a matter of speculation. And on my expected return the following year it would be for the purpose of estimating the number and to study their peculiarities, if any, in color, size, horn formation, and diet. And so it was with less reluctance that, after several days' rest, the canoe was turned down the rapid stream.

On passing the sand-bar where the bear had greeted us silence was the order of the day, and we glided by with all the armament in easy reach. At the next bend the canoe nearly ran into a band of 50 elk, lying drowsily in the sun on a small, sandy island, with two or three old cows standing guard. From this I concluded that the big silver-tip had deserted the neighborhood.

That night, August 4, we made camp under a high mountain at the southeast corner of the lake. I had previously arranged that the canoe would go down the shore a distance of 10 or 12 miles to Signal Point, where a big fire was to be built after dark at an elevation sufficiently high to be seen 20 miles diagonally across the lake, and on the following afternoon the launch was to come for us, as it was not considered safe to cross this deep, wind-racked lake in a canvas canoe.

And now occurred the suggested sequel in bear antics and best detailed by the camp note-book.

Photo by George Shiras, 3rd

COW AND CALF MOOSE IN A LAGOON

The cow shows a small tassel or a "bell" under the throat

ANOTHER BEAR APPEARS

"AUGUST 5, 1908—Ther., 80°-50°.

"Last night we had a surprise. I was awakened at 9 o'clock by loud yells from the guides' tent, followed by cries of 'Bear! bear! bear!' Seizing the little revolver and hurrying out of the tent, I looked about in the moonlight, but saw nothing. Approaching the guides' tent, I asked what was wrong. Thereupon Hammer, who had not yet succeeded in crawling out of his sleeping bag, said that a big bear had just seized the sack containing all our salt meat and canned goods and made off with it, an investigation showing this to be true.

"Farrell, perhaps irritated at the idea of going on short rations for two days, declared that my habit of placing bait close to the camp for the purpose of coaxing into view coyotes and other prowlers of the night was responsible for the bear's intrusion, and while, of course, it was a black bear, he was of the opinion it had not developed its thieving habits about any of the tourist hotels, since we were more than 30 miles from the nearest one by any land route. He was certain it was not a grizzly, since he never knew one to enter an occupied tent.

"The next morning, about 75 yards away, we found the bag, as well as a can that had contained raspberry jam. The contents of the latter had been extracted through perforations made by the animal's large teeth, and though pressed nearly flat the can was otherwise unbroken.

"On thinking the matter over, I now felt entitled to make one exception to photographing animals in the park, and that I ought to remain that night for the purpose of taking the bear's picture by flashlight, as it was quite certain that he would return in search of another feast. The guides, viewing the matter from a humorous and not a photographic standpoint, thought it would be a good joke on the bear. It was thereupon agreed that the two guides should take one tent and paddle down the shore to Lookout Point, where the signal fire would be built, and then on the following morning they could

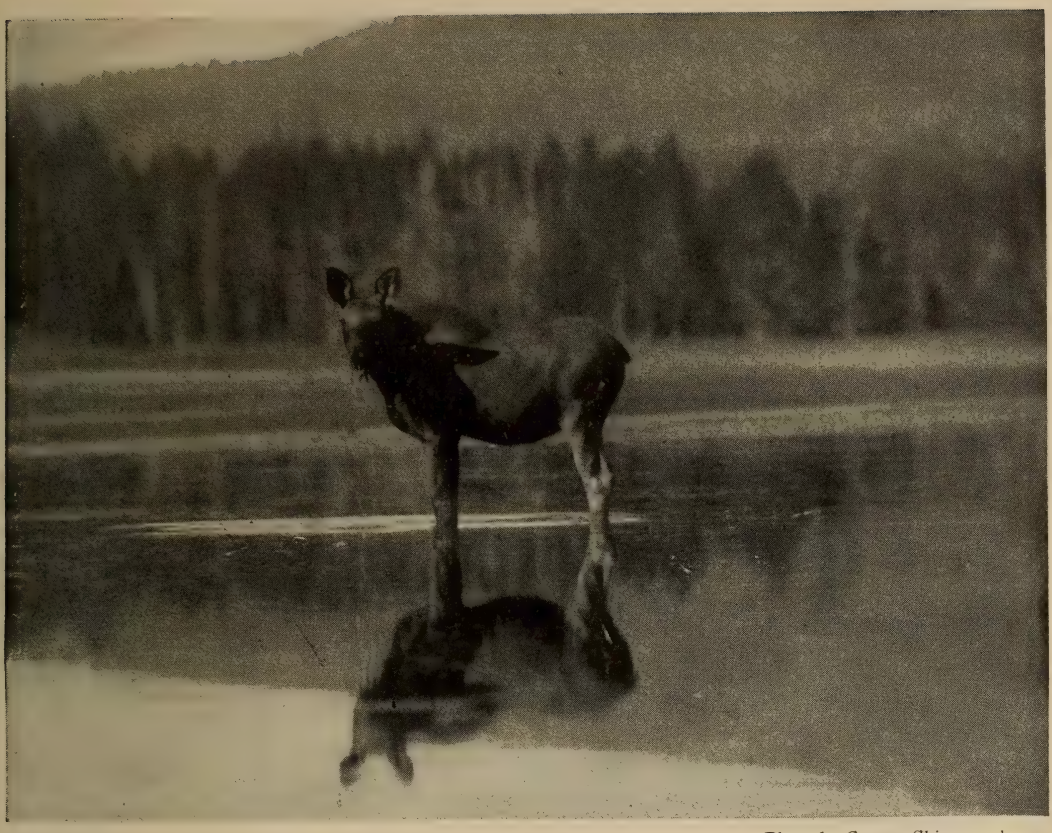

Photo by George Shiras, 3rd

MOOSE CALF

This animal was found feeding some distance from its mother and was approached to within 15 feet in a canvas canoe covered with pine brush. Note its splendid condition and the reflection in the water.

return for me in plenty of time to be picked up by the launch.

PREPARING FOR THE FLASHLIGHT BATTLE

"After the men had passed out of sight, I began preparations for the coming bombardment. The little table, made of driftwood, in front of the guides' tent, had been left standing, and on this I placed two cameras, facing down the elk trail. To a stake 30 feet away were hung some trout, with a string running to the flashlight apparatus. Impatiently I awaited the coming of twilight, sitting for a time on the edge of a hill watching some moose feeding in ponds a few hundred yards this side of the river.

"As the day declined the light of the nearly full moon became so brilliant that I could see plainly 75 yards down the trail. I was surprised, as time passed, that there had been no signs of the bear, and at half past nine concluded to lie down in the sleeping bag, where I had not been more than five minutes when a metallic click indicated that a bear or some other animal had pulled the string of the flashlight machine and that it had missed fire. Hastily looking out of the tent, I saw a large, dark animal leisurely devouring the fish, and knew it had already thrown open the shutters of the cameras; but, in the absence of an illuminating flash, the effort was a failure.

"For a minute this was disconcerting, until I recollected I had a hand flashlight apparatus, loaded for any emergency, and that by crawling to the cameras I could fire this and get precisely the result that would have been obtained had the other one gone off.

"This plan I attempted to put into exe-

Photo by George Shiras, 3rd

COW MOOSE AND CALF

These animals were found in a pond back of the south arm, in a beautifully wooded district of the upper Yellowstone

cution, but just as the finger was pressing the trigger came a deep "waugh" and then the sound of a heavy animal running away. Looking over the cameras, I saw the bear galloping down the elk trail and disappearing around a bend.

"Examining the apparatus, I found that the safety catch had not been withdrawn, and the firing pin, in striking an intervening piece of steel, made the click mentioned.

ANOTHER SURPRISE

"For several minutes I worked away resetting the shutters and adjusting the string, when I became aware of heavy breathing close by, and in some trepidation looked about, but could see nothing. Raising up slightly, so that I could see over the stand, there, within 5 feet of me and sitting on its haunches, was a huge silver-tip grizzly. The bright rays of the moon fell directly upon the head and breast, while the little, beady eyes stared at me steadily, the half-open mouth showing a fine set of teeth. And this was Farrell's "black" bear, and my guides sitting by a glowing fire a dozen miles away!

"To run for the tent, where were my revolver and axe, seemed a dangerous proceeding, for visible evidence of fear invites attack from any dangerous animal, wild or domestic.

"An instant later I realized safety was at hand, for, reaching out, I cautiously picked up the hand flashlight. By shoving this close toward his face and firing it, closing my eyes at the same time, the animal would be so blinded for several minutes as to be unable to see, and in the interim I could reach the tent, even were he disposed to be ill-tempered after such a greeting.

"Realizing this, I looked at the bear with more composure, trying to figure out the best way of making him depart without alarming him too much. Finally I gave a low, steady hiss; whereupon he came down on all fours, and descending the bank, passed through some thick bushes, where I could hear him walking along the gravelly beach.

Photo by George Shiras, 3rd

NIGHT PICTURE OF A SILVER-TIP GRIZZLY: THE FLASH FAILED PHOTOGRAPHICALLY, BUT PROVED A GOOD BURGLAR-ALARM

The nearest tree on the right was knocked down by the bear when blinded by the flash

MAKING READY FOR THE SECOND EFFORT

"By this time I had made up my mind to give the silver-tip a surprise the next time; so, removing all the flashlight powder from the hand flash, together with some I had in a box, I added all this to the original load, placing on top of the powder a large flat stone, for the purpose of increasing the speed of the flash and so that the noise would awaken me, were I asleep, besides letting the bear know that something was happening.

"Hurrying back to the tent, the hand flash was reloaded and the axe and pistol put in easy reach. An hour passed, and finally it had become half past eleven, but no bear. Worn out with continual watching, I once more thought it best to get into the sleeping-bag.

"Whether it was some presentiment, after undressing, I went once more to the front of the tent, and sticking my head out through the narrow opening, had just gotten it around far enough for my right eye to see the cameras, when a large shadow seemed to flit across the camera stand, as if the flight of an owl had cut off the direct light of the moon.

"Before this impression had more than suggested itself, from the table came a dazzling burst of light such as I had never seen equaled by any bolt of lightning. It shot high into the air and extended on either side many feet. Several whirling missiles cut through the pine branches above the tent, while a roar like that of a cannon added to the excitement. An instant later the flat stone came down, striking the edge of the tent.

"My right eye was, for the time, useless; but twisting my head around, I saw a large gray object roll down the bank from the camera stand and land in the bushes, where there was a great thrashing about for a moment, and then up the bank came the big silver-tip, headed almost directly for the cameras, missing them by a foot or two. A yard further on the bear struck a tall poplar with his left shoulder, the slender tree coming to the ground with a crack and a crash,

Photo by George Shiras, 3rd

ELK AT SOUTH END OF YELLOWSTONE LAKE

Along the outer shores of the south and southeast arms and on the big promontory were numerous elk, while throughout the river valley they occupied the hills above the moose, coming down often to feed in the valley meadows. They ate willows to some extent, about the sole dependence of the moose in winter; but by October 1 began migrating to lower ground. The above picture shows a big bull and his family migrating south.

having been broken off at the base without being uprooted. The animal, tripped and thrown to one side by the collision, rolled over on its back and for a second lay there motionless, with four big feet sticking rigidly up into the air. Then he scrambled up again, and I saw that he was headed in the opposite direction from that in which he had been going; so he had turned a complete somersault—quite a performance for an 800-pound animal. But all sense of direction had been lost, and with another rush the bear passed the cameras and shot out over the bank, catching with his feet, as I discovered later, a large boulder, and together they went in a heap to the bottom.

"By this time I was beginning to chuckle. The next move was a plunge through the fringe of bushes between the elk trail and the lake shore, and 75 yards away I saw him cross into a small gully, up which I could trace his going and, later, his ascent of the mountain slope by the rolling of the loose stones and shale. Finally all was still save the silvery ripples breaking on the beach.

"Examining the seat of war, I found that the huge flash, placed entirely too near the cameras, had burned most of the leather off the boxes, and little was left of the flashlight machine except the bedplate. The leaves on the overhanging poplars were burned or whitened for a distance of 30 feet, and altogether the place presented a scene of devastation.

"Looking the ground over in front of the cameras, I saw where the bear had made the first whirl as the flash exploded, when he was not over two feet away. While I was gazing from the tent the bear evidently had been standing erect, possibly wondering whether the bright barrels of the lenses contained raspberry jam, as sugested by his experience the night before, when his teeth pierced the can of jam. As he dropped upon all fours it gave the appearance of a

Photo by George Shiras, 3rd

BIG BULL ELK WALKS HEAD FIRST INTO FLASHLIGHT STRING

Here the camera and flashlight machine faced the opening between the stake and the tree on the right. The big bull probably caught the string in his antlers.

shadow, and in the descent his body had struck the string running from the flashlight to the bait. When the explosion occurred his head and shoulders must have been within the radius of the flame and fumes.

"Is it, therefore, any wonder that he was surprised at the demonstration? Possibly in his cubhood days he had become aware of the danger of putting his feet in the boiling geyser springs, and possibly he had some sad experiences sniffing in vent holes filled with sulphurous steam, but I doubt if he had ever dreamed of anything that equaled this."

A week later the negative was carefully developed, though certain to be a failure from the close proximity of the bear and the heavy charge. The reproduction of this scene appears on page 829.

While the flash failed photographically, it was quite a success as a burglar-alarm, and no one need fear of any camp ever being invaded again by the singed grizzly of the Upper Yellowstone.

SECOND AND THIRD TRIPS ON THE UPPER YELLOWSTONE

On the 30th of August, 1909, smoke curled from our fire at the camp site made memorable by the robber bear of the previous year. Guide Farrell was then in Alaska, and his local successor viewed with interest the stricken poplar, picking up a bunch of grizzled hair still adhering to the bark. It may be here observed that on this visit not a bear was seen, and only one at a distance the following year. Yet daily dozens of brown, black, and grizzly bears grow fat and in-

A COW ELK TAKES ITS PICTURE AT NIGHT

Photo by George Shiras, 3rd

During the rutting season of the elk, in September, 1910, they moved about some on the full of the moon. The camera had been set for moose, but got the best female elk picture in the author's collection

dolent at the garbage piles behind the park hotels, and it has been estimated that each season more than 5,000 pictures are taken at distances varying from 5 to 100 feet. Ordinarily so wary and secretive are these animals that photographing them is a difficult task, and I can only recall two good pictures of bears taken in the wilderness. Thus no more striking reason can be given for the camera hunters passing by such animals when they have become tamer than many kinds of domestic stock. If pictures are taken in game reservations the conditions under which they are obtained should be clearly indicated.

At the urgent request of the former superintendent, General Young, and repeated by his successor, Major Benson, I consented on my next trip up the river to Bridger Lake to take a series of pictures of park moose, because, as they said, upon such tangible evidence the existence and abundance of these animals would be more readily established in the minds of those not familiar with my investigations or the verbal report made thereon. So far as known, not one of the 200,000 tourists in the previous 15 years had seen a moose within the boundaries of the park, and this, it was contended, warranted the waiver of my rule.

In the accompanying pages are a few of the moose the camera saw, and they represent a still smaller fraction of those seen at a distance or when the failing light made the camera useless. On this trip I counted some 300 moose, allowing when possible for duplication on successive days. During one afternoon, from an outlook on the mountain side, I saw 19 feeding at one time and all within a radius of a mile.

On the way up the river I looked particularly for shed antlers, finding a number along the banks and many more in the willow thickets, where the moose browsed in winter time. Selecting a dozen of the best, they were brought out, the residents at Gardner expressing astonishment at an antler they had never seen in Montana before, yet the animals that once bore them lived hardly 50 miles away. This collection, now in the possession of the Biological Survey, represents three distinct types, with several intermediate forms—variations due, doubtless, to the high altitude of the valley and the inbreeding of the original stock. In the southeast arm and up the valley to Bridger Lake I saw comparatively few cows with calves early in the season.

On the third trip, made during September and October, 1910, we camped two weeks in the long south arm of the lake and found this locality to be as little frequented by man as that on the other side of the dividing promontory, although a beautiful island in the center of the bay affords a splendid camping place, and from it we watched the moose and elk day after day. Here we found the nursery of the cow moose, and fully 80 per cent of the 400 seen were cows and calves.

On the second afternoon 21 moose, including two bulls, were seen at one time in the shallow water of the bay—a sight rarely witnessed in the districts where this animal is deemed most abundant. It was now the mating season of the elk, and no more exciting scene can be imagined than the great bulls fighting for supremacy, while the cows and calves looked on with awe. As late as October 1 not half the bull moose had their antlers free of velvet, and consequently were in a less combative mood than the elk.

I think it can be safely said that there are 1,500 moose living throughout the year in the valley of the Upper Yellowstone, an area 2 to 5 miles wide and 20 long. Until a visit is made in midwinter on snow-shoes, when the animals have yarded, it will be impossible to estimate the number accurately. On the accompanying map, page 818, an x has been used to designate where moose were seen during the three seasons of investigation. On the shores of either arm of the lake the x mark shows the farthest the animal was seen to the north, while at intermediate points they were more or less abundant. Since my original trip many of these animals or their offspring have taken possession of smaller valleys in the park, and many others have reached

Jacksons Hole—all the result of a safe refuge—making possible the restoration of this splendid animal in the adjoining States, provided they are adequately protected.

THE CAMERA IN THE CONSERVATION OF WILD LIFE

The feeling which I have so strongly expressed for the camera as the better medium for testing one's skill in the pursuit of wild animals and birds, in acquiring a knowledge of their habits, and finally in getting a sufficiently satisfactory and enduring trophy, may create the impression that the author looks with considerable disfavor upon those who hunt with a deadlier weapon. Very much to the contrary is the case whenever the sportsman shoots in moderation and is willing to coöperate in the efforts to conserve the game supply by shorter seasons, by the establishment of game refuges, and in the elimination of the market hunter.

For it must be kept in mind that were all wild game given continuous protection and their predaceous enemies destroyed the world would soon be overrun and a menace arise threatening not only the comfort, but in many cases the existence of man himself, while in the end the rigid protection of all the supposedly harmless wild creatures would result in the eventual starvation of many.

An example which may be cited is the great and steadily increasing elk herd of Yellowstone Park, where the original and timely preservation of this animal has saved a species permanently for the Rocky Mountain States. Yet so abundunt has the elk become, under continuous protection in its refuge, that during severe winters thousands die of starvation in the foothills, and many pictures have been taken of the animals gazing wistfully at the well-guarded haystacks of the Jackson Hole settlers, and finally dying within a few feet of food necessarily reserved for the domestic stock of such settlers.

The sentimentalist who decries the killing of all game birds and animals is not infrequently one who grumbles when a joint is tough because, forsooth, the lamb was not killed earlier in its gambols. Such sympathy is inconsistent and such reasoning purely selfish.

For the explorer, trapper, miner, homesteader, forest rangers, and all who love to dwell for a few months in the wilderness, the utilization of fish, birds, and animals is, of course, wholly justifiable.

On the other hand, the market hunter, who converts the products of his gun into dollars, is not one who can be expected to change his methods, and therefore the present appeal is intended for a large class of sportsmen, who do not depend upon game for a food supply and make their excursions into the wilderness or upon the waters under the influence of another incentive, and whose efforts are misdirected in the means employed.

The successful wing-shot, who enjoys plucking from the air a bird on its meteoric flight across the sky, can, if he tries, capture one, a dozen, or 100 within the confines of a sensitive plate, while a marsh scene or the rolling breakers give a life view in striking contrast to the pathetic heap of bloodstained, rumpled feathers marking at the close of day the accuracy of his aim. So, too, the big-game hunter, rewarded in his quest for an antlered head, may continue on during the remainder of his woodland visit taking many more, but in a way that neither lessens life nor the enjoyment of the hunter.

UNTOURED BURMA

By Charles H. Bartlett

BURMA: What does that suggest to you? You know it to be one of England's possessions in the East, and if you have circled the globe you recall having touched at Rangoon. You remember the Shwe Dagon Pagoda and the "Burmese maid," with her "whacking big cheroot." Perhaps you ran over to Mandalay by train, slid down the river by boat to Prome, and rejoined your steamer by train to Rangoon. At least, assuming you to be the average tourist, this will nearly comprise your impression of Burma.

Yet you will have seen nothing of the Burmese people nor of Burmese country. Your guide was probably a Madrassi (of no caste); all the gharri drivers are Indians and many shop-keepers are from India or Armenia. Some Burmese there are (in the small shops you find their women), but they are quite metamorphosed, brought up to date, as it were.

The commercial development of Burma has been for the most part Scottish. It is *British,* but not *English,* and therein lies a distinction familiar to all who know England and the English. One arrives in Burma only via English settlements and by English steamers, and usually without that enthusiastic interest which disposes one to incur discomfort and to overcome difficulties.

Burma is governed as a department of India. Her taxes are all paid into the Indian treasury, and her Scottish residents complain bitterly of the policy which doles out such funds as are appropriated for local improvements and the development of the country. Nothing has been done in the way of road building except for a few miles around Rangoon. There are no good roads in fact and no spring wagons outside the large towns. For conveyance in the country there are only the native bullock carts, without springs, and here are none of the trotting bullocks of India, even could one endure a gait faster than a walk over the rough trails, which are the only roads.

The Burmese have not reached the stage of development requiring hotels; hence there are no Burmese hotels. Those in the large towns, for foreigners and supported by foreigners, are bad and very dear.

Yet Burma is a country of surpassing interest, and once outside the triangular tourist's path, bounded by Rangoon, Mandalay, and Prome (none of which is typically Burmese), one may journey at will among a simple, happy, kindly people, still very young and wholly unspoiled by contact with the West. It is a country of mystery, where *nats* (nature spirits) still dwell in mountains, trees, streams, and temples—a country inhabited by many tribes, widely diverse in customs and physical characteristics, living as they lived 1,000 years ago; tribes among which the Burmese are only one, but happened to be in the ascendant at the moment of England's conquest of the country.

Much of this country may be reached by the Irrawaddy and its estuaries, where a comprehensive service is established. For such a journey only a single servant is necessary, as in India or Ceylon.

THE NECESSITY OF A PERSONAL SERVANT

If the traveler arrives from the East, he will secure a "boy" at Rangoon. Usually the "boy" will be a Madrassi, a no caste—that is, an outcast—and so may do any sort of work without trenching on his religious principles. He is usually a worthless, no-account fellow, whom no resident, white or native, will employ.

If Ceylon is visited first, the Cingalese servant from there will be far and away superior to the Indian. The writer kept his Cingalese "boy" throughout India and Burma with satisfaction. He had "caste," and so did not carry luggage, prepare baths, nor do other menial labor, but he saw efficiently to the doing of all these things, waited on us at table, cared for our chambers, made our purchases of supplies, paid the coolies, arranged the tips; in fact, assumed full responsibility for all petty details, leaving us free

TEMPLE ON EAST SIDE OF THE SHWE DAGON PAGODA: RANGOON

Unlike the pagodas, which are substantially built of brick, almost all the temples in Burma are constructed of wood. They are light, graceful buildings, generally embellished with intricate and often singularly beautiful carving. They are but one story high, crowned with a succession of roofs diminishing in size as they ascend, thus producing a spire-like effect.

THE ENG-DAW-YD PAGODA: BURMA

Pagodas greet the traveler everywhere in Burma, and are the centers around which the religious life of the people revolve. There is at least one at every temple, and more than one at every monastery. A pagoda is a solid edifice of brick in the form of a cone, and in many cases raised over a tiny relic chamber. There is no interior, the place of worship being the surrounding platform. Many of them, as, for example, the famous Shwe Dagon at Rangoon, are covered with pure gold leaf from base to summit, and making benefactions for their upkeep is a favorite way of acquiring merit.

Photo by Samuel R. Stern

RETURNING FROM THE RIVER

The Irrawaddy is to Burma something of what the Nile is to Egypt: It is the great highway of the country; its waters irrigate the great rice fields and serve as a water supply to the towns along the bank. The Burmese, both women and men, are passionately fond of bathing, and this picture shows a girl in the streets of Prome returning from her morning bath, with the day's supply of water on her head.

Photo by Samuel R. Stern

BURMESE LADY SMOKING

From the cradle to the grave the Burman is never without his cigarette; men, women, and children seem to smoke all day long. The Burmese cigarette—a fearful and wonderful thing, between 1 and 2 feet long and seldom less than two inches in diameter—can easily serve as a weapon of offense and defense. One cigarette often serves as a day's smoke for an entire family, each member taking his turn down to the baby who can scarcely walk.

Photo by Mrs. Ronald Gleason

THE STERN OF A RICE BOAT ON THE IRRAWADDY

"The whole is roofed over with arched bamboo rods, covered by matting. At the stern a high poop deck gives the craft its characteristic appearance and forms a sort of throne for the captain steering. These boats are propelled by poles and paddles up the narrow creeks, or spread great square sails of palm fronds on the open river when the wind is fair. The owner and family often live aboard" (see page 842).

Photo by Alfred Joseph Smith

PALAUNGS FROM THE HILLS

The Palaungs wear a loose jacket of some dull color, faced with scarlet or bright blue velvet. The tribe to which they belong may be known by the width and color of the stripes running horizontally around their short skirts. Rich Palaungs wear loose belts—broad and plain—of solid silver in addition to many cane girdles. It will be noticed that the camera did not make them feel very happy while posing.

for the full enjoyment of the journey. The small fees he distributed for the menial labor he ordered instead of doing was no doubt a fair offset, at least to the dishonest extortion of the average Madrassi, and his dignity, honesty, and uniform courtesy so endeared him to us that our parting was one of real regret. That "boy" stands out as one of our happiest memories.

For a more extended journey, involving the necessity of leaving the waterways, some provision must be made. A bedding outfit will be needed, and the same which would in any event be purchased for India will suffice here. Then such supplies and cooking utensils as will enable one to do his own catering (fresh eggs and chickens may be purchased en route), and in addition to the "boy" he would have in any event, a cook will be needed. A Mugh cook is the best if obtainable. Some mosquito netting should not be overlooked.

WHY MEAT IS DIFFICULT TO OBTAIN

Thus equipped, an extremely interesting journey may be made. For instance, through the Shan States northward to the ruby mines or the oil fields, thus passing through the country of several interesting peoples. If the luggage be in convenient sizes (not exceeding 50 or 60 pounds each) for packing on mules, and

Photo by Alfred Joseph Smith

PALAUNG BEAUTIES: BURMA

The richer Palaung women wear curious necklaces of silver, flat and quite plain, and sometimes so large as to reach down to the waist. Around the wrists are heavy twisted bracelets of solid silver, and many of their cane girdles are embellished with silver wire. The Palaungs are a quiet, well-conducted set of people, sober and hard-working, and, unlike most of their neighbors, far from warlike.

saddles be taken along, more rapid progress may often be made. The weather, except for a few rainy days at Christmas time, is good for the most part from December to March.

At any town the subdivisional officer ("S. D. O." for short) will assist in procuring carts or mules, and his good offices will often be needed to requisition chickens. The Burman does not take life, and sometimes refuses to sell chickens to be killed. A law obliges villages to furnish supplies (to be paid for, of course) for officers and troops passing through. This shrinking from the taking of life, a characteristic which the Burman shares with the Hindu, is not from the teachings of Buddha, who is said to have been an eater of flesh, but is a relic of some belief or superstition antedating Buddha. It is very real, however, and kill he will not, not even a venomous snake or tarantula.

Except for the law, an officer would be reduced to what he could carry with him, so far as flesh of any kind is concerned. No one would kill, or furnish to be killed, any live thing. Thus when we stayed in a government "Circuit House" at Pagan, there was a cook and a caretaker, a well-furnished house and kitchen; but the S. D. O. gave a village headman orders to levy such chickens, etc., as we might require. *We* gave the orders, and so the sin of killing fell on us. No need for the S. P. C. A. among the Burmans! The town gharri drivers are never Burmese, they believe horses so used cannot be kindly treated.

Dak bungalows are to be found nearly everywhere, though often only shelters and not always provided with crockery and cooking utensils. There are many very comfortable "circuit houses" built for and used by the government officials,

Photo by Alfred Joseph Smith

BURMESE COUNTRY FOLK

The Burmese are possessed of a gay and lively disposition, and have often been called "the Irish of the Orient." They are more independent, but less practical than the Hindu, while they have not the keen business instincts of the Chinaman; and as both these people have entered Burma in considerable numbers, the native has now to fight for his economic supremacy.

who are very courteous to any properly accredited travelers.

THE GREAT RIVER HIGHWAY OF BURMA

On the other hand, though on land one must travel in the saddle or by bullock cart, the Irrawaddy River and its estuaries offer a superb highway, with an adequate steamboat service. If the cargo boats be chosen, many small villages will be visited, and often there will be time enough to stroll through these villages; or, when tied up at night, to attend a *pwé,* which, in the form of a dance or other entertainment, is of frequent occurrence when the moon is full. These are always free, and all the world is welcome to the "treat" some villager is giving.

Especially is the river journey interesting above Mandalay, and one may go as far as Bhamo, some 1,500 miles from the mouth of the Irrawaddy.

The commercial activity of the country follows the Irrawaddy, and there are yet hundreds of small native craft which carry much of the rice to market, returning with supplies for the people dwelling on the small tributaries of the great river where the steamboat does not go. These craft have hulls of great logs "dug out" as our southern Indians built their canoes. The whole is roofed over with arched bamboo rods, covered by matting. At the stern a high poop deck gives the craft its characteristic appearance and forms a sort of throne for the captain steering. These boats are propelled by poles and paddles up the narrow creeks, or spread great square sails of palm fronds on the open river when the wind is fair. The

Photo by Helen Woodsmall Eldredge

A BRIDE AND HER ATTENDANTS AT A KACHIN WEDDING: BURMA

When Kachin girls are of marriageable age they leave their homes at night, with the consent of their parents, to stay at a house set apart for the purpose. There they meet the bachelors of the village and choose a husband from among them. The formal wedding takes place when the girl is quite sure which man she wishes to marry. After the ceremony she walks to her new home between rows of pigs, which are slaughtered as she passes, their blood wetting her feet.

owner and family often live aboard (see page 839).

Here and there wallow herds of half-wild water buffalo, and now and then appear enormous elephants, beside which the native and his tiny hut look like toys.

The moonlight nights are entrancing, with the gauzy mist over the paddy fields (rice is "paddy" till it is harvested), while from some near-by pagoda comes the musical sound of gong or hollow tube as the kneeling worshiper attracts the attention of his gods. Everywhere one hears the rhythmic "thump, thump" of wooden tamps in long hollow troughs as the rice is threshed, often to the sound of music; for the Burmese dearly love to work to such accompaniment.

THE PAGODA CITY OF THE OLD KINGDOM

Going up the Irrawaddy, there is nothing of special interest below Mandalay, except the ruins of Pagan, which richly repay a visit. Here, scattered over a considerable area (some 8 miles along the river and 2 miles wide), lie the ruins of a city the story of whose building and decay vie in romantic interest with that of Carthage. Here were once thousands of pagodas, some very beautiful; and a few, in a fair state of preservation, still exhibit the varied styles of the peculiar architecture of the time and country.

It was about the beginning of the Christian Era that Pagan was founded; but 1,000 years later, Anawrata, King of the Burmese, made it the great city known to history. It seems that a hostile tribe dwelling on the shore at Thaton had received direct from Ceylon—center and head of the Buddhist faith—the pure doctrine and teachings of Buddha. The Burmese king sent to this tribe, asking for copies of these "books of the law," but was refused.

Therefore he went in person with an army, destroyed the capital of this selfish people, and took back with him not only the books of the law—seven elephant-loads of them—but the king's wives, his

GRAVE OF KING MIN-LIN MIN: BURMA

These royal tombs are among the finest specimens of Burmese architecture. They are built of brick and stone, elaborately carved, and are bright with gay colors and gold leaf. Like the pagodas, they always stand on a broad square pedestal, which elevates them some distance above the ground.

SHANS LOADING COMMISSARIAT STORE

These great hats are worn by all Shans—men, women, and children—and when new have the appearance of shields rather than hats. To look down on a market-place in any of the Shan States is like looking on a field of gigantic mushrooms. So great is the size of their headgear that in narrow passages the people often have difficulty in passing each other.

architects, builders, and principal craftsmen. Them he commanded to build him a city. Thus runs the story, and though Pagan was never a religious city in the sense in which Lhassa, governed by monks, is a religious city, it came to have a great many pagodas, thousands of them (later one ruler is said to have used 4,000 of them at one time to build fortifications); and some of the best of these, in better or worse state of preservation, are all that remain of ancient Pagan. Excavations are being made under the scholarly S. D. O. (a native Burmese who was a sort of secretary to the last king), who has uncovered some very interesting buildings.

Pagodas were built of stone and brick and so remain, while the palaces of the king and his people, uniformly of wood, have long since disappeared. From the 10th to the 13th century Pagan was a celebrated center of Buddhist learning. Fugitive bands of Buddhists from India

A GROUP OF CHINS

The Chins are the wildest of all the tribes in Burma. They are hillsmen from a range which runs along the boundary between Burma and Bengal, which was included in the former country in 1895. Up in these hills the power of the British is hardly felt, the native chiefs still ruling in accordance with the tribal laws, but subject to the more or less shadowy control of a European resident.

A SHAN BEAUTY

In the hot weather the Shan girls discard the bright jacket usually worn and draw up the underskirt, which is then tied tightly under the arms. The overskirt is of the brightest hue and often covered with the most elaborate embroidery. The turban is black, with many rows of bright colored silk and gold threads running through it. Young girls arrange the ends so that they hang loose at each side of the head behind the ears, which are pierced to receive ornaments, usually cylinders of gold, jade or even colored glass.

KACHIN WOMEN

Kachin women wear short skirts of strong, heavy cloth of the brightest colors. Their jackets are of velvet or cloth, ornamented with cowrie shells, silver discs, and white bone buttons. The turbans of married women are black, while the girls wear no kind of head-dress. They wear a great many cane girdles, from 10 to 20 or more, between the waist and the knee. These girdles are generally black, but sometimes they are white or scarlet, embellished with the inevitable cowrie shells.

CHIN GIRLS

These girls belong to a tribe that have hardly come into contact with civilization. Unlike the Burmese, who are Buddhists, they are worshipers of nature spirits, and, although some missionaries have settled among them, but little progress has been made.

PAGODAS AT PAGAN

"Though Pagan was never a religious city in the sense in which Lhassa, governed by monks, is a religious city, it came to have a great many pagodas, thousands of them (later one ruler is said to have used 4,000 of them at one time to build fortifications); and some of the best of these, in better or worse state of preservation, are all that remain of ancient Pagan" (see page 845).

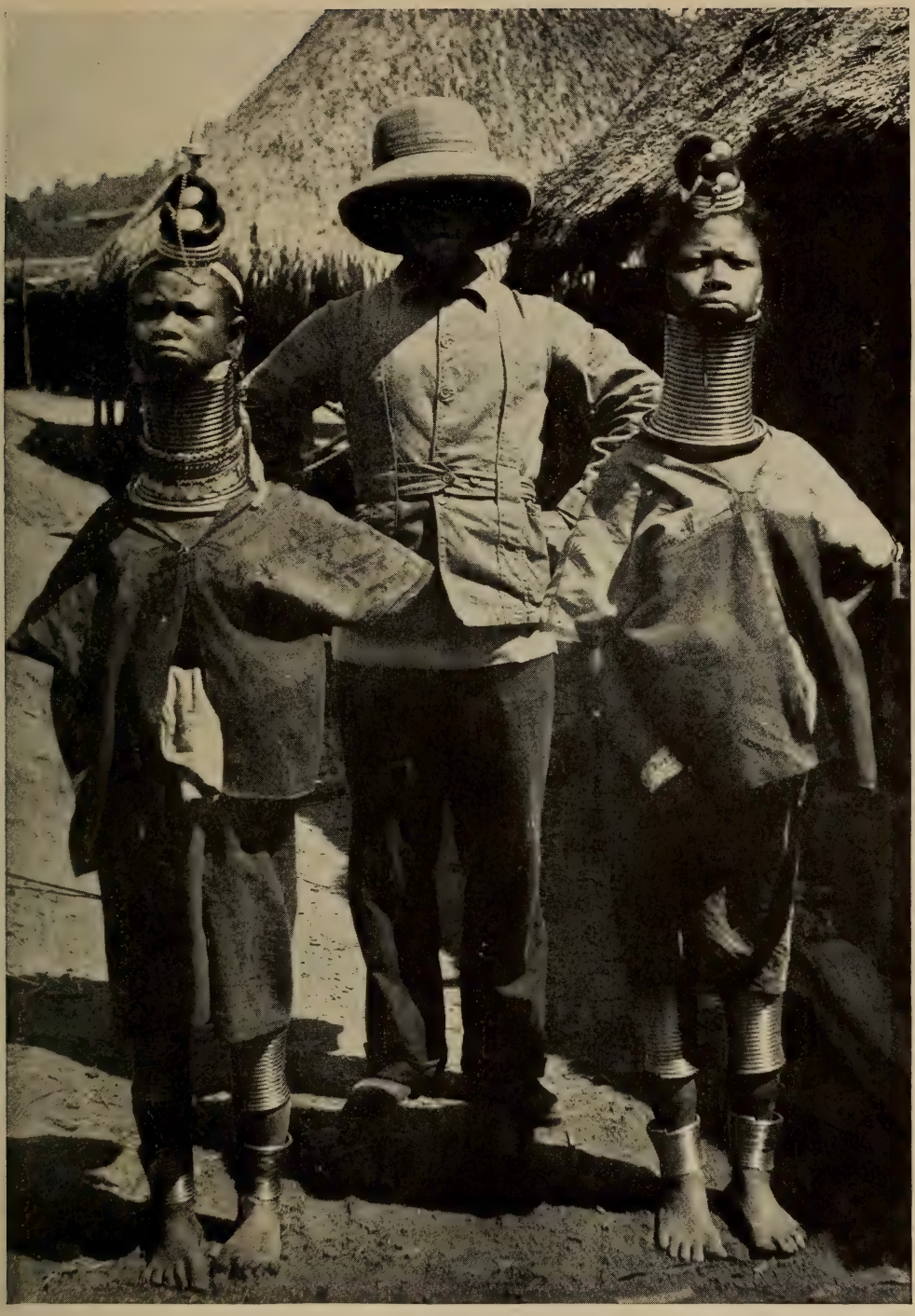

Photo by Alfred Joseph Smith

PALAUNG WOMEN OF UPPER BURMA

"The females of one branch of the Karens and Palaungs wear brass rings around their necks, arms, and legs, weighing, it is said, 50 to 60 pounds. The neck rings, as thick as the little finger, are put on the girl in infancy, four or five rings at first and others added as fast as she grows, till 18 or 20 keep the neck always stretched" (see page 852).

and fraternities from Ceylon were welcomed, given separate quarters to live in, and permitted to "write, wrangle and excommunicate each other to their heart's content." The end of the 13th century saw the fall of Pagan, and it has ever since remained a deserted city.

FLOATING DEPARTMENT STORES ON THE IRRAWADDY

At Mandalay begins a journey into the country of the hill tribes, at war with each other till within a few years. It is said that "head-hunting" has not even now entirely ceased. From Mandalay the journey up the river should, by all means, be made by cargo steamer.

Not only does the cargo boat stop at tiny villages and at many points where one sees no signs of a village, but she tows, lashed alongside, a barge nearly as large as herself. This barge and the great after-deck of the steamer form one big "department store." Space is rented to native merchants, who go back and forth each trip, supplying the native with everything he needs, from sarongs to betel.

Each merchant, in his few square feet of allotted space, arranges his wares exactly as in the little booth along the village street. Hundreds of natives swarm aboard at each stopping place, carrying baskets and bags for their purchases.

One is reminded every hour of the day from how many and diverse elements is to be welded the Burmese nation of the future. All originating from the same parent stock (except, perhaps, the Selung tribe), the various tribes have through the centuries contended for possession of lands, hunting and fishing grounds, for life of the simplest form, till their characteristics have become as distinctive as if of different races.

There prevails, too, in most of the clans a curious system of endogamy, which is or was very strictly enforced. Only the people who live in certain groups of villages, for instance, may intermarry, or in some cases only cousins are permitted. The half-grown boys are separated from the girls and are kept apart till married. The Burmese, though in the ascendant, are really one of many tribes making up the population of Burma.

THE MANY TRIBES THAT INHABIT BURMA

Here are the stocky, picturesque Shans, with their bright plaids, heavily bedecked with brass and silver buttons, bells, and other ornaments. The Kachin women wear a score or more belts of narrow hoops, stained black and falling over the hips in a manner to require frequent adjusting. They come from the Shan States to the East; are rather attractive in form and feature; eaters of lizards, of beetles, of snakes—in fact, of everything except human flesh, which is forbidden.

Here are (so-called) white Karens, heavy and stolid and very dirty, of fairer skin than the Burmese and with a more distinctly Mongolian eye. They take kindly to Christianity, whole villages at a time, as also do the Red Karens, a tribe less numerous, small and wiry, with broad reddish faces. Heavy drinkers these, somber in mien, formerly very wild and savage, they have been reduced from stealers of men to stealers of cattle.

Here are men and women of many clans or tribes, their characteristics in form, features, and dress sufficiently marked, but so varied and complex as to render classification difficult except after study and a longer acquaintance.

The females of one branch of the Karens and Palaungs wear brass rings around their necks, arms, and legs, weighing, it is said, 50 to 60 pounds. The neck rings, as thick as the little finger, are put on the girl in infancy, four or five rings at first and others added as fast as she grows, till 18 or 20 keep the neck always stretched (see page 851).

And so one journeys on and on, each day bringing new scenes, new types of people to study, and all at least 1,000 years behind the epoch in which we live. Everywhere are pagodas—great pagodas, little pagodas, all sorts and sizes of pagodas, to fit the purses of the people who sought to "gain merit" in their building.

The Burman is not provident. If he has money he spends it at once. He builds a "rest home," a pagoda, a shelter for a water-jar at the roadside for the wayfarer, and keeps the jar filled with water; always he gives to the monks,

and often when in funds his generosity takes the form of a *pwé* at full moon. For this he engages musicians, actors, and dancers, and invites everybody to come. The stage is usually covered, but the audience sits under the sky, strolls under the trees, eats, smokes, sleeps now and then for an hour, while all night long the entertainment goes on.

Beside each village is a monastery, and about the monastery are always noble trees, for Buddha commanded meditation under the trees. These monasteries are of teakwood, dark and rich in coloring, and bring out in sharp relief the yellow robes of the monks.

A SIMPLE GUILELESS PEOPLE

Here are no noble classes, no aristocracy, none very rich, none very poor.

Superstitious as are all ignorant people, believers in charms, their superstitions never take the form of cruel rites, blood offerings, etc. Their lives are frank and open, with none of the dark places so common to other Orientals.

This may not always be so literally true, as in the pictures sometimes drawn by some enthusiastic travelers, where one is shown the family eating, the sleeping rugs spread on the floor, beneath which, in all the primitive simplicity of a pastoral people, are the cattle in their stalls. This is, however, by no means untrue, taken as a general average, of this simple, happy people, where everything is open to the light of the day. They marry and divorce without constraint of any religion; their women are the freest in the world, and they are chaste and happy to a degree rarely to be found elsewhere.

The Burman minds his own affairs and meddles not at all in his neighbor's. Courteous assistance *when it is asked,* and an equally courteous and infinitely more rare non-interference under all other circumstances is the rule in Burma and the teaching of Buddha. Here is no officious advice, no managing the affairs of others. How rare! How beautiful, even if carried to the extreme of letting a man drown himself if he be so minded or die in any way he pleases.

The traveler, to acquire any wisdom in his travels, must go always with an open mind. He must not judge Buddha, Brahma, or Mohammed from the acts of their followers any more than he may judge Christ from the acts of men of Christian nations, or His teachings from the way we do not embody them in our lives. We are sure there has been revealed to us in our religion truth from behind the veil. We cannot prove it except by our faith, our belief. The Oriental is equally sure that his is the true faith, that through his prophet was revealed the divine truth.

This attitude of mind is essential to any comprehension of other peoples, of their customs, of their lives, and this is why missionaries going out with intense religious conviction (which is very necessary), surcharged with zeal *against* all other religions and even sects sometimes fail to get into really sympathetic relations with the devout of other faiths.

IN THE STREETS OF LEH

The city of Leh is the capital of Ladakh, sometimes called Little Tibet. It lies at an elevation of over 11,000 feet above the sea, in a narrow valley, through which flow the upper waters of the River Indus. This picturesque town, surrounded by walls, is a great trading center, and to it flock merchants from other parts of Kashmir, from Lhasa, Afghanistan, and Turkestan. An active trade in furs, shawls, and wool is conducted here. It is also an important religious center for the northern Buddhists, both on account of its own lamaseries and temples and of the important

PEASANTS OF LITTLE TIBET

Little Tibet is the most barren and inhospitable region in all Kashmir, and its unfortunate peasants wring with difficulty a living from the soil. The climate is very severe, and furs, even if only sheepskins, are a necessity. The soil is sterile, but the sides of the mountains which lie in a sheltered position are terraced with great skill and cultivated with an almost incredible industry. Up to an elevation of 13,000 feet above the sea these peasants, by careful attention, manage to cultivate the apricot, and they grow barley, buckwheat, and apples sufficient for their own use.

PEASANT LIFE IN ALBANIA

In the mountains of Albania the lot of the peasant is often squalid in the extreme. They possess no land of their own, but work that of the great Moslem land-owners on the métayer system, moving from place to place and living in miserable straw huts. The condition of the women is pitiable; they are subjected to the heaviest toil and live in complete subjection; they bring no dowry to their husbands and are purchased at a price, like cattle.

TRIPOLITAN PILGRIMS EMBARKING

One of the most picturesque sights at any North African port is the annual departure of the pilgrims for Mecca. This picture shows the embarkation of pilgrims at Benghazi, one of the ports of Tripoli. It is an animated scene; the crowd has come from all parts of the country. There are nomads from the desert, negroes from the oases of the far Sahara, half-breeds from the ports, and stately Arabs from the coast. These pilgrim crowds, though picturesque, are a source of danger to the cities they pass through, as they often carry with them diseases of every kind. A few years ago the pilgrims introduced typhus into the port of Benghazi, and it raged with such virulence that 8,000 people died in a few weeks.

SEMEISKI WOMEN

The Semeiski are a sect of Russian nonconformists who have emigrated to Siberia and have established themselves on the eastern shores of Lake Baikal. They are a thrifty, industrious, and moral people, living in great isolation, which has tended to preserve their curious costume. They are excellent farmers and grow all the grain used in the government mines in Siberia. In each Semeiski village there is a prayer-house in which all the inhabitants say their prayers in common and where the elders read the lives of the saints and explain difficult texts of Scripture. They live without priests, but once every three years they assemble at Yaroslav, a town on the upper Volga, where one of their priests resides, to receive the sacraments. During the interval baptisms and marriages are performed by the local elders.

SEVILLE CIGARETTE-MAKERS AT WORK

In Southern Spain man is too dignified to work, so when anything has to be done it falls to the lot of his women folk. Not even will he supply his own luxuries; so his cigarettes have to be made for him by the gentler sex. In good truth, however, it must be admitted that Spain has no monopoly of this system; our own factories are filled with women.

A MADAGASCAN QUEEN AND HER COURT

Before the annexation of Madagascar by the French, the island contained a large number of kings and queens, tributary to the sovereign at Antananarivo. This photograph was taken when Queen Binao, the ruler of the country around Norri Bé, in the northwest of the island, made her submission to General Gallieni, representing the French government.

VOL. XXIV, NO. 8 WASHINGTON AUGUST, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

THE ASCENT OF MONT BLANC

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I FIRST saw the monarch of Swiss mountains from the town of Geneva. Far away on the horizon, 60 miles to the eastward, the great white pyramid, clearly visible from the city streets, lifts its hoary bulk aloft into the azure sky, far above all the surrounding peaks of Savoy. And at evening its huge mass of snow and ice is a sheen of red and golden light, whose brightness seems only to have the substance of some fantastic cloud reflecting the fiery hues of the western sun.

But when viewed from the village of Chamonix, grandly situated at its base, the effect is still more imposing. I had approached the tiny town—so famed in the story of Alpine climbing—from Argentière, which lies at the entrance of the romantic vale of Chamonix.

Everywhere the eye is charmed with the harmonious blending of nature's varying tints. Green meadows and dark pine woods heighten the beauty of the snow-white glaciers, which extend like frozen torrents from the summit down into the very valley, their lower courses separated by great forest-clad promontories projecting upward into the sea of ice and crowned with huge rocks carved into obelisks and other titanic shapes, intermixed with patches of snow.

The mind is almost overwhelmed with the grandeur of the massive wall inclosing the valley all along its eastern side, with its succession of noble peaks covered with eternal snow, and the stately, needle-like rocks—the so-called Aiguilles—which seem to pierce the sky, the whole mass culminating just over the village in the central summit, the mountain monarch towering in regal majesty amidst his court of subservient attendants.

As we gaze up at his huge outline, we see two long, irregular ridges, like enormous arms, descending from the giant's shoulders, the two rounded peaks just below the summit on either side, Mont Blanc du Tacul and the Dôme du Goûter, the one ending in the Aiguille du Midi, the other in the Aiguille du Goûter, whose spurs reach far down into the valley below (see pages 862 and 874).

Between these mighty arms is the course of the snow valley, sloping upward to just below the summit, which gives to the mountain its pyramidal effect when seen from a distance and its peculiar character and name, and as we look up from the village street, the effect is overpowering. Above us, all above us, with its broken and jagged slopes and majestic glaciers, is the mass of the mountain, its great snowy dome surmounting all, and apparently almost directly over us.

In the moonlight it is grandest of all, when summit and sides are masses of glittering crystals, and withal seemingly so near and so easy of access, though it

GENERAL VIEW OF THE MONT BLANC CHAIN

Photo by S. G. Wehrli

This great mountain mass is divided between France, Switzerland, and Italy. France has the lion's share, Italy the steepest slope, and Switzerland the most fertile portion. This photograph was taken from the Flégère (5,925 feet), one of the peaks of the Aiguilles Rouges, on the other side of the Chamonix Valley.

Photo by S. G. Wehrli

CHAMONIX AND MONT BLANC

Few tourist resorts anywhere in the world have greater charm than Chamonix. Everything that nature and art can accomplish has been done to render this little town attractive. It is crowded both in summer and winter with visitors of every nationality and rank

Photo by S. C. Wehrli

ARGENTIÈRE CHURCH

Argentière is the next village to Chamonix, further up the valley. It stands at the foot of the tremendous Argentière Glacier, which descends from Mont Dolent (12,543 feet) almost into the village street

took many a season's diligent search and toil before a way was found by which to scale these dizzy heights.

Courted and frequented as the regal white mountain is now, until a little more than a century and a half ago it was scarcely known beyond the precincts of its own valley. Its name cannot be traced farther than 1742, though the history of the village and valley of Chamonix goes back to the Norman conquest.

Doubtless even in Roman days this region was inhabited, as an inscribed boundary stone of Vespasian's day is still visible on the valley side of the Col de la Forclaz, probably on the old Roman road over the Mont Blanc Range, which connected Geneva with Aosta; and the name Chamounis, which first occurs in the Mercator Atlas of 1595, is undoubtedly a corruption of "champs muni," the French translation of "campus munitus," the medieval Latin name of the valley, the fortified camp being the little valley with its mountain walls.

But the first authentic date in the history of the valley is 1091, when Aymon, Count of Geneva, bestowed on the Benedictine abbey of St. Michel de la Cluse, near Turin, the "campus munitus"; by the 13th century a priory was founded, whose priors enjoyed almost absolute jurisdiction over the wretched peasantry, until, scarcely a century ago, the valley was finally delivered from the infamous rule of the canons of Sallanches, to whom the priory had been transferred in 1519, and the commune of Chamonix destroyed the monastery and the Chamoniards became free men. During the last few years of this struggle travelers first began to visit the wonderful sights of Chamonix, which drew them henceforth in ever-increasing streams.

THE LOVER AND THE FRIGID LADY

Even earlier, visitors had occasionally come to look at the "glaciers," as Mont Blanc was then called. One of the earliest of whom we have any record was a Monsieur Pays, who wrote a letter from Chamonix, May 16, 1669, to a lady whom he had the misfortune to over-admire. Upbraiding her for her coolness, he wrote in part:

"In my despair at leaving you, I vowed I would throw myself over the first convenient place. But until now, though for 15 days I have ascended and descended the most dangerous mountains of Savoy and skirted the brinks of a thousand precipices, I have not thrown myself over. . . . I must not deceive you. The pleasure of looking at your portrait in this frightful country has always kept me back when I proposed to execute my intention. . . . Here, madame, I see five mountains which are just like you. Five mountains, madame, which are pure ice from top to bottom." Our charming lover doubtless referred to the five glaciers on the Chamonix side of the range.

It is therefore clear that too much stress should not be laid on the "discovery" of Chamonix by the two English travelers, Pococke and Windham, in 1741, though their visit undoubtedly brought the little town into greater prominence. Their party of eight, accompanied by five servants and many pack-animals, left Geneva in June, arriving in Chamonix on the third day.

As every one then supposed the valley was inhabited by brigands, the party was armed to the teeth and, not daring to enter any house, camped out in the open air, keeping up fires and watches all night. Next day they had an opportunity of meeting a number of these supposed brigands, as several of the poor peasants served them as guides to the great glacier, known as the "Mer de Glace." After a day's experience on this part of the mountain, the party returned to Geneva, carrying back wonderful tales of the horrors of crevasses and avalanches experienced in their heroic undertaking. A large granite block carved with the names of these two worthies and the date of their visit is still to be seen near the glacier.

THE SHOEMAKER'S SON INTRODUCES THE MOUNTAIN TO THE WORLD

Their account roused the curiosity of one Peter Martel, the son of a French refugee shoemaker of Geneva, who led another party to Chamonix the next year. In 1744 he published an account of his

Photo by S. G. Wehrli

THE MER DE GLACE

The Mer de Glace, or "sea of ice," is the most famous of Swiss glaciers. Rising in the higher regions of Mont Blanc, it flows down to the valley, an enormous ice-cataract 4½ miles long and varying in breadth from a mile and a quarter to half a mile

Photo by G. R. Ballance

SERACS ON THE MER DE GLACE

In all ascents where glaciers have to be crossed these *seracs* are a constant source of difficulty and danger. Always avoided where possible, it sometimes happens that they have to be climbed, and it takes an experienced mountaineer to select one sufficiently stable to bear the weight of a party.

visit, together with that of Windham and Pococke, in the form of two letters.

These descriptions are interesting, for they give us a good idea of Chamonix of that period. It seems that at this time only the lower ends of the glaciers were visited, though there were already guides and porters. Windham makes no mention of Mont Blanc itself, an omission so remarkable as to make us think the summit was invisible during his visit; but Martel mentions the mountain four times, and as he is the first to make use of the name in print, the honor of introducing the great "white mountain" to the world must be given to this poor shoemaker's son.

It now became the fashion to visit the "glaciers." Many people came to Chamonix; among others, a young professor from the Geneva Academy, named de Saussure. He climbed the peak of the Brévent (see picture, page 869), the mountain inclosing Chamonix on the west, and conceived the idea of ascending Mont Blanc itself for the purpose of making some scientific experiments. So he proclaimed a reward for any one who should discover a route to the summit.

As yet, probably no one had thought of ascending the mountain; at that time only crystal searchers and chamois hunters ever ventured on its upper reaches. And although now a few feeble attempts were made, notably by Pierre Simon, it was not for 15 years that the first serious attempt to gain the reward was made.

EARLY ATTEMPTS AT THE ASCENT

Four peasants climbed the narrow, pine-covered ridge of rock called the Montagne de la Côte, which separates the two glaciers of Taconnaz and Bossons, and got some little distance up the

ice of the "junction" above; but, discouraged at finding they could not go up and down in one day and afraid of spending a night on the ice, they gave up the attempt.

Eight years more elapsed before three other chamois hunters, in 1783, tried the same route. They spent the night at the top of the Montagne de la Côte, just below the ice fields, and at daybreak started bravely up the glacier; but they soon gave it up, owing to the overpowering desire of one of their party to sleep.

The great heat of the sun, which is experienced even at high altitudes on the glaciers, seems also to have greatly perplexed these peasants, as well as the superstition, which is yet prevalent in some parts of the Alps, that it is fatal to give way to sleep at such altitudes. They seemed to fear that their companion would succumb to sunstroke, and one of these hardy mountaineers greatly amused de Saussure by declaring that if ever he ventured up again he would carry only a parasol and a bottle of smelling-salts!

"When I picture to myself," wrote the Professor, "this big and robust mountaineer scaling the snows, holding a little parasol in one hand and a bottle of smelling-salts in the other, nothing gives me a better idea of the difficulty of the undertaking and its impossibility to people who have neither the heads nor the limbs of a good Chamonix guide."

They returned with swollen lips and blistered skins, showing that the Chamonix guides of those days were unaccustomed to high elevations, as otherwise they would have prepared themselves to resist the effects of the sun, even in the snow fields; for often while the feet are nearly frozen the face is badly burned, necessitating the use of a cap drawn over the face or the application of burnt cork to the skin.

Later, in the same year, a Geneva artist named Bourrit, a great lover of mountain scenery, attempted the same route, camping out as the others had and starting up the glacier at daybreak. However, a cloud hovering around the summit soon scared his party out, and they bolted for Chamonix as fast as they could go. The next year Bourrit tried it again from another side of the mountain, by the glacier of Bionnassay, behind the great ridge or arm descending from the Dôme du Goûter; but the weather proved too cold and only two of his men reached the Bosses du Dromadaire, the two knobs or camel-like humps just beyond the Dôme du Goûter, the highest point probably so far gained; finally *they* came down like all the rest.

THE BUILDING OF THE FIRST HUT

De Saussure heard of the new route and had a hut built far up on the Bionnassay side in order to make the start from a higher level. In September of 1785 he made the attempt himself, but the lateness of the season made the ascent impossible. Doubtless his presence on the mountain stimulated the guides to fresh endeavors to win the prize offered a quarter of a century before.

The Geneva scientist had a second hut built, still higher up, for he was convinced that the summit could only be reached from this side, as crossing the ice fields of the "junction" above the Montagne de la Côte seemed to him impracticable. Not all the Chamonix guides, however, were of this opinion, some still clinging to the old route.

So the two factions got to betting on the respective merits of the two routes, until it was finally arranged that one party should try the old route and the other the new one and see which would first arrive below the summit. The start was made June 30, 1786, there being three guides in each party. The three ascending by the Montagne de la Côte arrived at the ridge just beyond the Dôme du Goûter long before the party coming up from the west. They attempted to go higher by the ridge of the "Bosses," but this route proved to be so precarious—being flanked on each side by precipices—that even these practiced mountaineers gave it up; indeed, the ascent by this ridge would be impossible without the use of the ice-axe, with which the Chamonix guides were not yet familiar.

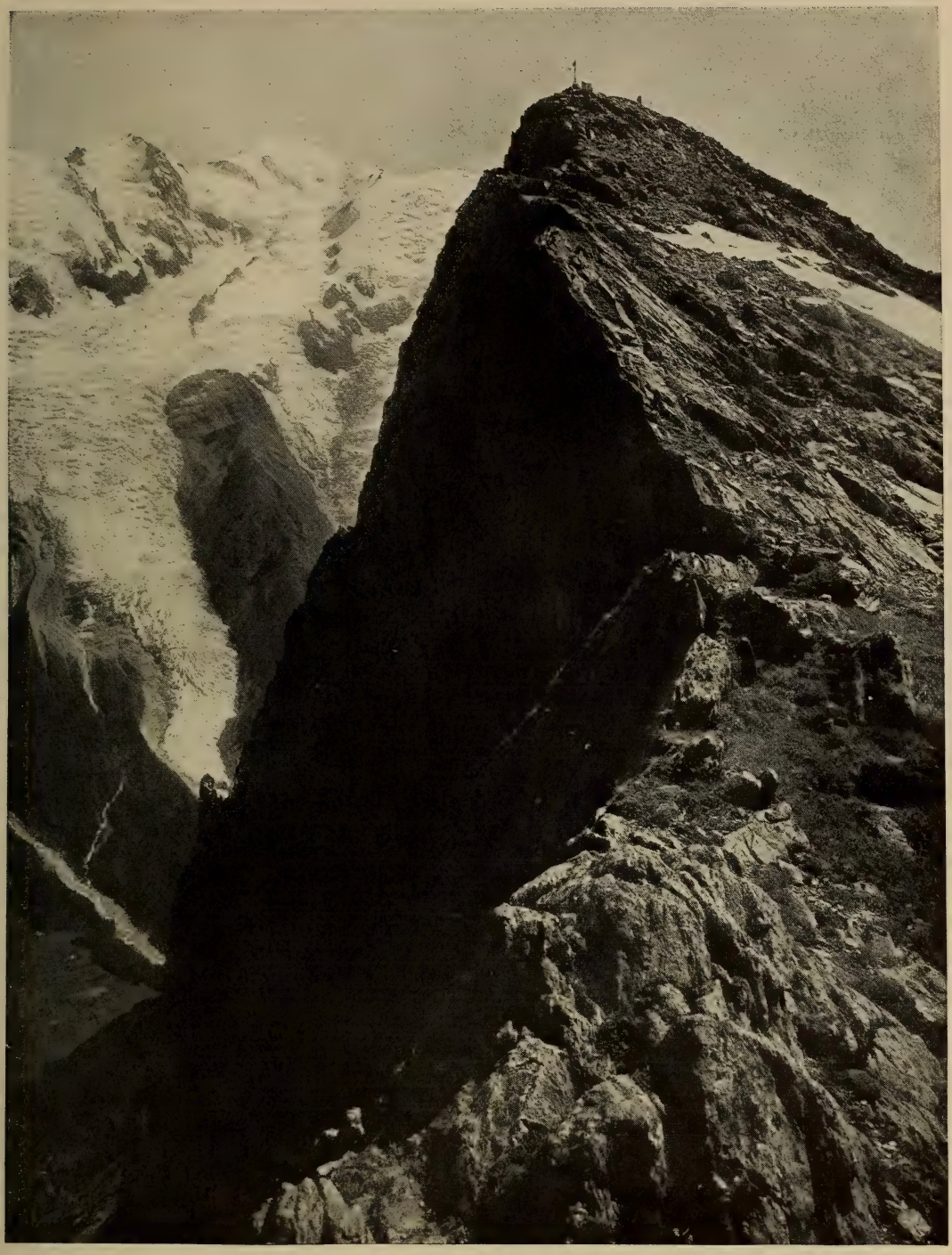


Photo by S. G. Wehrli

MONT BLANC AND THE SUMMIT OF BRÉVENT

Brévent is a gaunt peak, 8,284 feet high, lying on the western side of the Chamonix Valley, on the opposite side of which Mont Blanc rises in all its splendor

Photo by Donald McLeish

THE TREMENDOUS GLACIERS OF MONT BLANC

A view from Brévent on the opposite side of the Chamonix Valley. "Mont Blanc, from its peculiar formation, is almost wholly buried in its upper reaches in snow and glacier, so that crevasses and avalanches and all the other dangers peculiar to snow-climbing are a constant menace to the climber. The extreme cold and rarity of the air as you approach the summit are also serious obstacles" (see page 879).

Photo by G. R. Ballance

CATTLE ON BRÉVENT

These hardy Swiss cattle ascend the mountains each year in the early summer to graze on the high mountain pastures, which are technically known as Alps

AN UNWELCOME GUEST

With this party was a fourth man, a youth of 24, named Jacques Balmat, who seems to have attached himself to the others against their wishes. Just before the start for the summit, Balmat had spent two days alone on the Dôme du Goûter looking for routes, and was returning when he met the other three on their way up.

He was an unwelcome member of the little party, for he wished to win the reward and so did they. However, he would not be shaken off. When the others gave up the attempt, he stayed behind to look about further, the others perhaps having deserted him purposely.

"I found myself," said he, "alone, and was divided between a wish to rejoin them and an ambition to attempt the ascent alone. I was piqued at being left behind, and something told me that this time I should succeed." He gave up the idea of proceeding by the ridge of the "Bosses," and so descended a little to what is known as the "Grand Plateau," crossed it and ascended again on the other side over an icy path along the crest of the rocks called the "Rochers Rouges," on the armlike ridge of the mountain opposite. This route, now known as the "Ancien Passage," has long since been abandoned, owing to its danger.

BALMAT'S HEROIC FEAT

Balmat had to dig steps in the ice with the end of his stock, and finally, after incredible toil, he saw his way clear to the very top, for the "Rochers Rouges" are less than 1,000 feet from the summit. But night was approaching and clouds had begun to form around the summit, and besides he thought no one would believe his story if he did reach the summit, so he decided to retrace his steps.

Photo by G. R. Ballance

THE AIGUILLE DU DRU

This wonderful needle-like summit, the Aiguille du Dru (12,320 feet), forms one of the points in that marvelous series of mountains surrounding Mont Blanc. It is this group of peaks which gives to Mont Blanc a charm felt even by those in whom the mountaineering spirit has never developed. Many such are found in the little town of Chamonix, who never attempt to climb the mountains, but are content to watch the never-ending play of light upon the rocks and snow-clad peaks. The moonlight and sunrise effects upon the mountains have an indescribable fascination which draws to Chamonix all sorts and conditions of men.

When he had again reached the Grand Plateau, he found he was completely snow-blind. So he sat with his eyes closed for a half hour, until his sight returned; but now it was growing dark and he could not find the snow bridge over the huge crevasse which he and his friends had crossed early that morning. There was nothing to do but pass the night where he was.

Burrowing a hole in the snow, he kept himself as warm as he could, with the genial lights of Chamonix in full view far below him, where doubtless his companions were cosily seated around their fires or already tucked away in their warm beds. It seems incredible he could have survived the cold and exposure, and indeed only the most favorable weather conditions could have made it possible.

To think of this poor peasant guide, alone and unprotected, at this altitude—it was certainly two and a half miles above sea-level—fighting the numbing cold all the weary hours of that awful night and living to return to his home next day, makes his surprising feat all the more wonderful. To have ascended almost to the top of the loftiest peak in Europe, alone and with no other help than what a simple alpenstock could afford, and after two days of exposure to cold and rarefied air, is incredible enough. If he had not been endowed with an iron constitution and determination, he never could have performed such a feat and have survived. His fatigue was so great on arriving in Chamonix that he slept 24 hours without waking; but he could fall asleep with the proud consciousness that he alone knew the way up the giant peak, and that soon the reward would be his! Now he could laugh at his envious companions, who had so heartlessly abandoned him.

THE FIRST SUCCESSFUL ASCENT

He kept his secret even from his wife, and finally only divulged it to the village doctor, a man named Paccard, whom he heard was thinking of making the attempt to ascend the mountain. Though he might be (and as the sequel showed, he was) of little service as a companion, still Balmat wanted a witness, so the two determined to make the attempt.

Three weeks of bad weather delayed the project, but finally, on August 8, 1786, they started late in the afternoon, one taking the right and the other the left bank of the Arve, lest any one should learn of their intention, and rejoined each other at the top of the Montagne de la Côte, where they encamped about 5,500 feet above Chamonix. At half past one in the morning they were under way again, slowly making their way over the glacier and snow to the Grand Plateau.

The wind rose higher and higher, but undaunted the two worked their way over the same steep path that Balmat had traversed alone three weeks before. Gradually they mounted to the group of rocks called the "Petits Mulets," only 350 feet below the summit, and 600 feet above the "Rochers Rouges," where Balmat had arrived before.

Here they were assailed by such a squall of wind that for ten minutes they had to lie flat on the ice in order not to be blown off. The poor doctor became disheartened and would only proceed on all fours to a point whence the village could be seen far below.

With their glass they could see a crowd of people watching them through a telescope from the village street. Considerations of self-respect induced the poor half-frozen doctor to get on his legs, but he was too exhausted to go further. So Balmat made the last part of the ascent alone, himself suffering terribly from the freezing cold and the rarefied air.

THE SUMMIT CONQUEROR

Finally, about six o'clock in the evening, he stood where no man had ever stood before, at an altitude of nearly 16,000 feet. Waving his hat on the end of his stock, he saw he was answered from below, and soon he descended to where he had left the unfortunate doctor. He found him seated, motionless and almost asleep, but forced him to get up and try to walk. Finally, by main force, by pulling and pushing, he brought him also to the summit.

Photo by S. G. Wehrli

MONT BLANC DU TACUL AND THE GLACIER DU GÉANT

One of the subordinate peaks of Mont Blanc is known as Mont Blanc du Tacul. It stands in a mass of ice and snow at the head of the great Glacier du Géant, which merges into the Mer de Glace

Soon they descended, the doctor almost as helpless as a child, and towards midnight arrived at their former camp on the Montagne de la Côte, where they passed the night, suffering intensely from frost-bite. Next morning the wretched doctor was completely blind and had to make his entry into Chamonix hanging to the strap of his guide's knapsack! Balmat was himself almost unrecognizable, with his "red eyes and blue ears." But with all the pain he suffered, he could enter Chamonix with a proud step, for he had conquered where so many had failed.

The poor peasant guide now became known far beyond the limits of his native valley, even receiving a patent of nobility from the King of Sardinia, and he was henceforward known as "Balmat, dit Mont Blanc."

De Saussure soon learned of his success, and the next year, guided by Balmat and accompanied by 17 other guides and a servant, with a great quantity of physical apparatus, he made the ascent. Later he ascended the Col du Géant, a lofty pass in the range, and had two engravings made which show the manner in which he made his mountain ascents.

In the one showing his party descending, they are all wandering about like sheep; no rope is visible, each person helping himself with his alpenstock as best he may, and each, it may be remarked, using the stock wrongly, placing it before rather than behind him, on which to lean his weight, de Saussure himself seeming to be on the point of harpooning his own foot!

AN EXTRAORDINARY MOUNTAINEERING COSTUME

The Professor is dressed in a long-tailed silk coat with huge buttons—the very coat is said to be preserved in the ancestral mansion at Genthod, near Geneva—and he looks much more as if he were ready for an afternoon promenade than a climb on the ice fields of Mont Blanc. One of the party is carrying a ladder for crossing crevasses, a custom now for the most part given up.

Thus at length the mountain monarch was fairly conquered, and from this time on his neck may be said to have been bent beneath the yoke of man. But in the succeeding quarter century there were but a half dozen other ascents. Until 1819 the only variation on Balmat's route was at the beginning of the route, the Montagne de la Côte being given up for the route to the left of the glacier "des Bossons" by the Pierre à l'Echelle. In 1827 the so-called "corridor" route from the Grand Plateau was discovered by Sir Charles Fellowes, and since then the upper route by the "Ancien Passage" has been abandoned. In 1859 the route over the ridge of the "Bosses," which had proven too much for Balmat's companions, was found practicable, and is now even more popular than the "corridor" route. Still another route from St. Gervais—further to the south of Chamonix, in the valley—up over the Aiguille and Dôme du Goûter and the ridge of the "Bosses," has been coming into favor; and, besides these three routes on the French side, there are five others from Courmayeur, on the Italian side, though little used.

Many things have increased Chamonix's fame since de Saussure's day. In 1832 Alexandre Dumas visited the village and gave great publicity to it by the chapters in his "Impressions du Voyage," wherein he described his famous interview with the then aged Balmat. In 1842 Professor Forbes carried on his extensive studies relative to the movements of glaciers, establishing the fame of the great glacier, the Mer de Glace.

But it was the popular lectures given all over England by Albert Smith, and illustrated by dioramic views of his ascent of Mont Blanc, in 1851, which especially spread the fame of the mountain. As a result of these lectures, there were 64 ascents in the six years following 1851, whereas there had been only 57 in the preceding 64 years.

THE AIGUILLES MORE DIFFICULT THAN THE MOUNTAIN

And since 1851 not a summer has passed without at least one ascent being accomplished. The other peaks in the range have also gradually been vanquished one by one. The last to surrender

Photo by S. G. Wehrli

SERACS ON THE GLACIER DES BOSSONS

These great ice masses add to the picturesqueness and charm of mountain climbing, and also to its danger. An "ice-fall" is one of the things a good guide most seeks to avoid, especially at or just after the greatest heat of the day, which is the critical time.

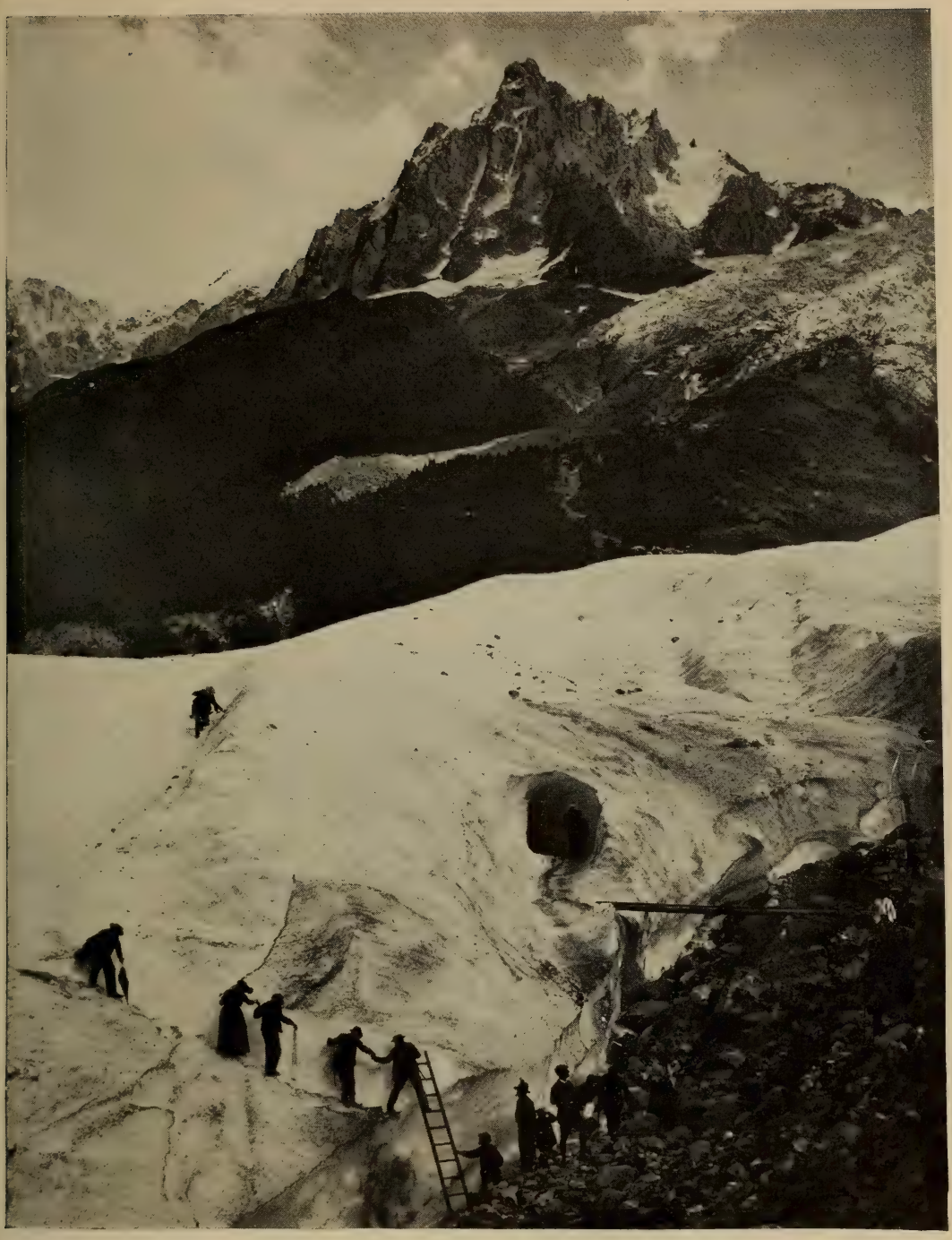


Photo by S. G. Wehrli

TOURISTS ON THE GLACIER DES BOSSONS

The visit to the Glacier des Bossons is the easiest of all excursions from Chamonix; so almost every tourist makes it. An electric railway takes him within a few yards of the glacier, and a grotto is dug into it for his benefit, so that he may enjoy to the full the beautiful color and purity of the ice. Above the glacier rises the sharp peak of the Aiguille du Midi.

Photo by S. G. Wehrli

AMONG THE SERACS OF THE JUNCTION

"Amid the broken ice of the Junction are many lofty and frequently overhanging pinnacles of ice, known as *seracs*. To ascend these needles is a very dangerous pastime, as they not infrequently topple over, and in passing them one keeps as far away from their bases as possible" (see page 880).

were the Aiguille du Dru, in 1878 (see picture, page 872); the Aiguille du Géant, in 1882, and the Blanche de Peuteret, in 1885. Although some of these needle-like rocks are far more hazardous to scale than Mont Blanc itself, still none of them rivals the main peak in interest; and, as time goes on, its fame increases and each summer greater numbers make the ascent, attracted either by the grand scenery, the interest of its past history, or by pure adventure, as it is the highest mountain peak in Europe (if we except certain peaks in the Caucasus), being only 58 feet less than three miles high. Down to the close of the season of 1906 there had been 2,176 different ascents recorded at the Bureau of Guides. The summit has been reached even in winter.

Although the ascent of Mont Blanc offers no greater dangers than that of some other Swiss mountains, it has the name of being the longest and most exhausting climb in the Alps. While such peaks as the Matterhorn and the Chamonix Aiguilles are so formed that no great quantities of snow can cling to their sides, and consequently present for the most part merely dangers incident to rock-climbing, Mont Blanc, from its peculiar formation, is almost wholly buried in its upper reaches in snow and glacier, so that crevasses and avalanches and all the other dangers peculiar to snow-climbing are a constant menace to the climber. The extreme cold and rarity of the air as you approach the summit are also serious obstacles.

HOW TO ASCEND THE MOUNTAIN

But with good guides and proper precautions, with a good pair of legs and good lung power, the ascent will not be unduly difficult. Before undertaking any of the higher peaks of Switzerland, it is well to have got oneself into training by walking over some of the passes and climbing some of the lesser summits, for it often happens that he who feels himself strong and starts this excursion by walking out of Chamonix with head erect and firm step, ends by having to be pulled up the final slopes.

Our first care, in arriving in Chamonix, one day in July, was to go to the Bureau of Guides and secure the services of a good guide and porter. A porter is simply a guide in the making, generally a younger man, who has attached himself to some guide, and who later on, after he has made a certain number of ascents, will be enrolled as a guide himself and receive the same compensation.

Then we set about procuring the necessary equipment for the two days' journey, such as ice-axes, hobnailed boots, woolen leggings and gloves, mountain caps which cover the face and protect it from blistering, dark glasses with wire sides to protect the eyes completely from the glare of the sun, and a goodly supply of provisions—for you would be surprised at an Alpine appetite. The guide himself brings a long coil of rope, about 100 feet in length, slung over his shoulder.

Our party left the quiet little village about seven o'clock in the morning. As an ascent of the main peak is not yet a very common undertaking in Chamonix, a few people were before the hotel to see us off. We followed the left bank of the Arve for some distance and then ascended by a zigzag path through the pine forest at the base of the mountain.

A RESTAURANT 7,000 FEET UP THE MOUNTAIN SIDE

Soon the larch and pine trees become thinner and are succeeded by meadows, far above which appears the imposing Aiguille du Midi, at the extremity of the great arm or ridge descending from the right shoulder of the mountain. Just beneath its base, and high up on a huge granite cliff overlooking the glacier of the "Bossons," is the shabby little chalet restaurant of Pierre Pointue, 6,723 feet above the sea, where, after our two hours' climb, we stop and rest and enjoy an unrivalled view of the Valley of Chamonix and the Brévent, the mountain directly opposite.

Now the main buttress, along the crest of which our way has so far lain, is abandoned, because the huge glacier of the Pelerins shoots down across it from the heights of the Aiguille du Midi; we therefore turn our course toward the icy stream that has now for some time been

seen glittering far below in the ravine at our right.

To reach the ice we follow a narrow, slippery goat-path, hollowed out in the almost perpendicular face of the cliff, our left shoulders rubbing the rock, while our right feet are on the edge of the precipice, which dips sheer to the glacier hundreds of feet below. Soon we stand on a mound of broken granite fragments mixed with gravel and ice, a lateral moraine, and work our way over this broken and rugged causeway, skirting the bases of the needle-like rocks, the Aiguilles du Midi, du Plan, and de Blaiterie, this part of the route being known as the Plan des Aiguilles. We arrive just beneath the Aiguille du Midi, where we reach another huge granite cliff, called the Pierre à l'Échelle, or Ladderstone, perhaps so named because the descent from it to the ice is here made generally with the use of a ladder.

DANGER FROM AVALANCHES

Constant avalanches of stones rolling down from the neighboring Aiguille du Midi make this part of the route dangerous. When the stones came down, often no larger than cannon balls and rushing with similar velocity, we would take refuge by crouching down beneath some projecting boulder.

At length we are on the glacier of the "Bossons." A wide waste of snow and ice stretching continuously upward, with an apparently easy slope, lies before us. At a distance of two miles, perhaps, are visible two isolated pinnacles of rock rising above the monotonous white waste. These rocks we watch with interest, for they are the "Grands Mulets," upon which is the tiny chalet where we are to spend the night (see page 882).

But the frozen slope before us is not as smooth and level as it seems at this distance, for we soon find ourselves in the midst of fearful, irregular forms of jagged ice walls, yawning chasms hundreds of feet deep, huge masses of half consolidated snow, the remnants of older avalanches launched long since from above, and everything mingled in the utmost confusion (see pages 876 and 877).

To cross this irregular mass is most laborious; in bad weather there have been occasions when even expert guides were unable to cross. In 1870, for instance, when a party of 11 perished near the summit, the rescue-party was detained at Pierre à l'Échelle several days. The first part of the distance is easy enough, lying merely over broken and fissured ice. But as we approach what is called the "Junction," where the two ice-streams, the glaciers of the "Bossons" (which we have just been traversing), and Taconnaz join, just above the buttress of rock known as the Montagne de la Côte, which causes them to divide again, the ice is fearfully upheaved, and frequently the use of the ice-axe is needed; hence progress is most tedious and the party is roped together to avoid falling into hidden crevasses.

Amid the broken ice of the Junction are many lofty and frequently overhanging pinnacles of ice, known as seracs (see page 878). To ascend these needles is a very dangerous pastime, as they not infrequently topple over, and in passing them one keeps as far away from their bases as possible. Huge masses of rock are constantly rolling down upon the ice or into the open crevasses from the heights above.

FREAKS OF ALPINE NATURE

These rocks often cause the ice below them to assume most fantastic shapes. As the surface of the ice gradually melts away, perhaps a foot in a week, these huge stones keep the sun's rays from the ice beneath them; so gradually, as the constant erosion and carving go on, they become like huge granite tables supported by thin crystal stems, which grow longer and thinner day by day, until finally the weight above causes them to topple over.

But small bodies, such as leaves, have just the opposite effect, for they absorb the sun's heat and communicate it directly to the ice below, and so holes are hollowed out. Though tons of granite are rejected and hoisted up into the air on solid pillars of ice, little flimsy membranes, like leaves, wafted over the ice by the summer's breeze and weighing only a few grains, are sucked down into

Photo by G. P. Abraham

A CREVASSE ON THE WAY UP MONT BLANC

"The yawning chasms are generally crossed by snow bridges which have drifted across them. If the snow bridge is too frail to allow the weight of a man upright, one of the guides often lies down at full length—of course tied to the rest of the party—and manages to wriggle across, and then pulls the next one over laid flat on his back. . . . As a last resort, steps are hewn in the faces of the crevasse, down on one side and up the other, descending as far as necessary in order to cross the chasm easily" (see page 885).

Photo by S. G. Wehrli

THE ASCENT OF MONT BLANC: THE GRAND MULETS

Mont Blanc can be ascended from almost any point of the compass, but the route usually followed is from Chamonix past the jagged rocky peaks known as the Grand Mulets. The tiny chalet, where most climbers pass the night, can be seen in the foreground of the picture

the depths. Such are the freaks of Alpine nature!

Over such difficulties we slowly cross the glacier, tied together in single file, through fissures and up precipices, where only the trained eye of the guide could find a way. Soon the Junction is passed and the way over the glacier of Taconnaz is easier. After making a long detour and doubling back again, as the way is too steep to ascend directly, we finally, after four or five hours of toil on the ice fields, reach the Grand Mulets, the last few hundred feet being at an angle of 45° and most fatiguing, for it is now just after mid-day and the snow is very soft (see page 884).

We are now some 10,000 feet above the sea and nearly 7,000 above Chamonix. These rocks were early discovered and made use of as a resting place by the first explorers of the mountain. It is an island of rock projecting from the snow, perhaps 300 feet over the glacier in front, the terminal peak of the granite buttress, the Montagne de la Côte, here finally cropping out again after being concealed by the glacier stream. A tiny chalet has been built here, where the climber can spend the night sleeping in a good bed.

THE SUPERB VIEWS FROM THE MOUNTAIN

The view over the Valley of Chamonix, with its mountain walls, is indeed superb. Over the top of the Brévent can be seen the distant Jura range, and even the shores of the Lake of Geneva are visible. The great Aiguille du Midi, from whose base we have just come, rises on one side of us, and the towering Aiguille and Dôme du Goûter, in the direction of which we are to proceed on the early morrow, are on the other. Back of us is the beginning of the long snow slope extending to the summit (though the summit itself is invisible), which we are yet to laboriously climb.

The sunset from here that evening was marvelous and the still starlight impressive: everything so hushed, you fancy you can hear the very stillness—the sense of absolute repose so unlike anything you have ever experienced before—for at night the thousand rills of water, which trickle over the glacier in the daytime like the pulse of glacier life, are now stilled. Only now and again a low rushing murmur breaks on the ear, the far-off sound of some avalanche heard for a few seconds and then ending in a muffled crash.

The little chalet is leased by the commune of Chamonix to a man and his wife, a most woebegone couple, whose dejected looks eloquently bespeak the solitude of their lives amid these eternal snows, where the thermometer each night stands at zero. Triweekly two hardy porters alternate in bringing up supplies from Chamonix, and they certainly earn their few francs a day.

No wonder a glass of water costs 20 centimes, even if it be melted snow, for every billet of wood used as fuel to melt the snow has to be brought from Chamonix, seven hours below!

THE SECOND DAY'S CLIMB

At one the next morning we are called, and after a hasty breakfast we are again roped together and under way. Like the last five hours of yesterday's climb, the route now to the very summit is over snow. We descend to the glacier again and once more begin our conflict with the difficulties of the ice, slowly picking our way, with the help of a lantern, up the snow valley between the mighty arms of the mountain. A zigzag climb soon brings us up the steep bank to a tiny level plain known as the First Plateau; three hours later we reach another level space, the Petit Plateau, directly under the ridge connecting the Dôme and the Aiguille du Goûter on our right (see page 886). The sun is now well up and we have the promise of a glorious day.

The little plateau is fissured with crevasses and covered by the remnants of former avalanches—a spot particularly dreaded by the climber at mid-day, because of the avalanches of snow let loose from the overhanging cliffs by the warmth of the sun. Without warning, thousands of tons of billowy masses may pour down upon this tiny level space.

Indeed, the dangers of avalanches on Mont Blanc are far more subtle and far more to be dreaded than those of cre-

Photo by S. G. Wehrli

THE GRAND MULETS

In the Mont Blanc range are numerous Aiguilles—sharp, needle-like points like the Grand Mulets—many of them far more hazardous to scale than the great mountain itself. These peaks have gradually been vanquished one by one. The last to surrender were the Aiguille du Dru, in 1878; the Aiguille du Géant, in 1882, and the Blanche de Peuteret, in 1885.

vasses, for they descend upon the unsuspecting climber with appalling force and without a moment's warning. No adroitness on his part can parry this danger; neither rope nor ice-axe is of any avail. Only as recently as 1891 two members of an ascending party were buried here by an avalanche, five others at the same time being swept into a crevasse.

So we kept as far to the east of the plain as possible, and soon, after two more hours of hard climbing, we arrived at the entrance of the last or Grand Plateau (see page 896).

WHAT THE GRAND PLATEAU IS LIKE

Imagine an oval ravine, as it were, sloping very gently upward for about two miles to the base of a conical peak, the summit of the mountain, its sides being formed by lofty walls of snow-covered rock, its entrance guarded by two almost perpendicular walls, and its bottom full of snow that has fallen into it for ages from the summit at its upper end and the ridges at its sides, and you have some idea of what the Grand Plateau of Mont Blanc is like. It is the head of the long snow slope facing Chamonix and beginning just below the summit.

The frozen stream slips down this inclined groove, almost unbroken by crevasses, to its base between the two shoulders of the mountain, the Dôme du Goûter and Mont Blanc de Tacul. Here its motion is impeded by the foothills of the Dôme, and it slowly works its way over to the Tacul side, where it shoots like a terrific ice-cascade over the slope below, forming an unscalable precipice.

On the Dôme side, owing to a greater angle in the slope, the lower ice glides on, but the upper part is torn apart, forming a huge chasm or crevasse always to be found here. This "crevasse of the Dôme" extends quite across the entrance of the plateau; and, as at one end there is an impassable precipice and at the other the almost perpendicular wall of the Dôme, it is clear that the climber must cross the crevasse before he can mount higher.

Many accidents have therefore occurred here. It was just above this crevasse that Jacques Balmat had to remain all night, as in the darkness he could not find the snow bridge which traversed it. In 1864 a porter named Coutlet, while descending with a party, fell into this crevasse. Two intrepid fellow-guides were lowered by ropes to a distance of 90 feet; but, owing to the suffocating air, could descend no further. They lowered a bottle a hundred feet further, but without touching bottom, and so the body of their companion was never found. Of all the dangers on Mont Blanc, that of the crevasse is the commonest.

HOW CREVASSES ARE FORMED

These huge rents in the ice are caused by the pushing of the half rigid, inflexible ice along over uneven surfaces; the mass may be broken by passing over a projecting ridge far below, in consequence of the huge weight above. In the higher parts of the mountain, as in the Grand Plateau region, the glacier is composed of névé; that is, consolidated snow, not solid ice. It is opaque and stratified, and has a dull white luster, instead of being greenish and transparent and of crystalline texture, as in the lower parts of the mountain. Lacking in compactness, it breaks easily if subjected to violence, and thus forms crevasses. The chasms soon disappear, for their sides are crushed together when new obstacles are encountered in front; and, as the ice is ever moving, new fissures are constantly being formed there. Hence, the crevasses seem to be stationary, though the ice in which they are formed is never still. But experienced guides know, however, that these gigantic rifts are always in the same places, just as are the rocks and peaks.

Generally the crevasses have smooth, perpendicular walls, though often they are hollowed out into beautiful caverns filled with greenish light, let in through their translucent roofs. Often, too, they are adorned with column-like icicles extending to the floor, just like pillars artistically designed.

These yawning chasms are generally crossed by snow bridges which have drifted across them. If the snow bridge is too frail to allow the weight of a man

ON THE WAY UP MONT BLANC

Next to Chamonix, the village of Bionassy, which lies some miles away, is the favorite starting point for an ascent. The route then passes the Aiguille du Gôuter and the Dome du Gôuter (14,210 feet), which are shown in this picture

Photo by S. G. Wehrli

CROSSING A CREVASSE

"In 1864 a porter named Coutlet, while descending with a party, fell into a crevasse. Two intrepid fellow-guides were lowered by ropes to a distance of 90 feet; but, owing to the suffocating air, could descend no further. They lowered a bottle a hundred feet further, but without touching bottom; and so the body of their companion was never found. Of all the dangers on Mont Blanc, that of the crevasse is the commonest" (see page 885).

A CREVASSE AND SNOW BRIDGE

"In the higher parts of the mountain, as in the Grand Plateau region, the glacier is composed of névé—that is, consolidated snow, not solid ice. It is opaque and stratified and has a dull white luster, instead of being greenish and transparent and of crystalline texture, as in the lower part of the mountain. Lacking in compactness, it breaks easily if subjected to violence, and thus forms crevasses" (see page 885).

upright, one of the guides often lies down at full length—of course tied to the rest of the party—and manages to wriggle across, and then pulls the next one over laid flat on his back. Sometimes ladders are used, but of late years it is seldom that a cumbersome ladder is carried. Sometimes by making a long detour a way across is finally found. As a last resort, steps are hewn in the faces of the crevasse, down on one side and up the other, descending as far as necessary in order to cross the chasm easily (see page 881).

TRAGEDIES OF THE CREVASSES

Perhaps some of you have read that weird tale entitled "Mrs. Knollys," by Mr. F. J. Stimson; how a young bride lost her husband in a crevasse on a Swiss glacier, and how, 40 years later, the then gray-haired lady returned to the scene of her grief, and, the requisite time for the movement of the glacier having elapsed, greeted the body of her husband, still in the same flush of youth as on the day of his disappearance, at the base of the glacier.

This story, seemingly so fantastic, has a basis of scientific truth in it, for there are many instances of bodies, which have been lost in crevasses, appearing again years later, for the glacier flows on irresistibly in a straight and steady course which no force can stem; whatever falls upon it moves with it, and whatever falls into the gaping mouths of its crevasses is carried down with it.

As an illustration of this movement, may be cited the terrible Hamel accident, in 1820, at the upper end of the Grand Plateau. After passing the last crevasse and starting up the slope of the "Ancien Passage," the snow beneath the party began to slip, all of them were hurled down in the suffocating mass to the edge of a huge crevasse, and three guides were swept into it.

In 1861, 41 years later, the dismembered remains of their bodies began to reappear at the lower end of the glacier of the "Bossons," more than four miles in a direct line from where the accident occurred. The bodies must have traveled downward at the rate of 500 feet per annum.

One of the surviving guides was still living when the remains of his old comrades were found. He remarked, "Who could have thought I should have shaken once more the hands of my brave comrade?"

Fragments of skulls, a forearm and hand, bits of a knapsack, a felt hat, tin lantern, shreds of clothing, and even a cooked leg of mutton, were among the various articles which first came to light, and a year later many other things were found.

In 1866 a Captain Arkwright and three others were also caught in an avalanche and hurled from the "Ancien Passage" into a crevasse at its base, on the Grand Plateau. The Captain's body was found in 1897 on the lower part of the glacier of the Bossons, miles away, and his watch and some other things appeared two years later.

MEASURING THE MOVEMENTS OF THE GLACIERS

The movements of these glaciers have been carefully studied by Professor Forbes, in 1832, and by Professor Tyndall, in 1857 and 1859. Forbes first proved that they were in perpetual motion. He watched holes, dug into various parts of the huge glacier known as the Mer de Glace, through a small telescope furnished with a graduated circle and planted on the glacier's rocky bank. He found these marks were carried downward faster when on the lower part of the glacier than on the upper, and faster in the middle of the stream than at the sides. He calculated the daily progress to be about 10 inches near the top, whereas it was about 25 near the bottom in the center and 16 at the sides.

In 1832 he discovered some fragments of wood in the ice, which were identified as pieces of a ladder which de Saussure had left at the upper end of the glacier in 1788 when descending the Col du Géant. So the ice had moved some 16,500 feet in 44 years, or about 375 feet per annum, somewhat slower than the glacier which starts from the Grand Plateau.

Photo by S. G. Wehrli

THE SUMMIT, SHOWING VALLOT'S CABIN

Just below the summit of Mont Blanc is Vallot's cabin, which can be seen as a square snow mass in the picture. "This little hut and observatory are 14,320 feet in the air. They were planned by Vallot, a French mountain enthusiast, who, in 1887, performed the unprecedented feat of camping out under canvas on the very summit of Mont Blanc for three days and nights" (see page 891).

But—after this digression—we are still at the entrance of the Grand Plateau. The snow bridge across the crevasse of the Dôme is easily found and crossed without any difficulty, as at this time in the morning—towards 7 o'clock—the sun had not yet softened the snow, and we finally stand on the last plateau. From here we have the choice of two routes to the summit, mounting the ridge on either side of this snow valley and proceeding along its crest to the top.

As the eye ranges upward along the plateau it falls upon a cluster of bare rocks protruding through the snow near the top of the valley to the left and just under the summit. These rocks are known as the "Rochers Rouges," and along the narrow path over their crest lies the route discovered by Balmat and followed by all the early climbers of the mountain. But the approach to these rocks over the loose masses of snow in the upper part of the valley was always considered the most dangerous part of the undertaking, for the least jar is often enough to precipitate an avalanche which will bury the climber or sweep him into a yawning crevasse.

In 1827 a new route, known as the "corridor," was found, by which the whole upper part of the plateau could be avoided. This route traverses the Grand Plateau for a short distance, then mounts to the top of the ridge by skirting the base of the lower Rochers Rouges, and thereafter follows this ridge all the way to the top, passing the upper end of the Rochers Rouges 14,794 feet high (where there is a tiny refuge-hut just where the old route, the "Ancien Passage," joins the new one), the Petits Rochers Rouges 250 feet higher, and the Petits Mulets only 350 feet below the summit.

THE WORST ACCIDENT IN THE HISTORY OF THE MOUNTAIN

At these last rocks there occurred, in 1870, the worst accident in the history of the mountain, wherein 11 persons lost their lives. The party had persevered in reaching the summit in awful weather, the wind blowing so frightfully that the swirling snow on the summit was even visible from Chamonix. They were just descending, and were seen at two o'clock near these rocks, and it was observed how often they had to throw themselves down to escape being blown off the slope. The top of the mountain was invisible for the next eight days.

As no one returned, a rescuing party of 14 guides finally started out, but could not even reach the Grand Mulets. A week later another party of 23 reached the summit, where the bodies of five of the unfortunate climbers were found frozen stiff in the snow.

A note-book found in the pocket of one, a Mr. Bean, of Tennessee, had the following entry of September 7:

"My dear Hessie: We have been on Mont Blanc for two days in a terrible storm. We have lost our way and are in a hole scooped out of the snow at a height of 15,000 feet. I have no hope of descending. . . . We have no food. My feet are already frozen and I am exhausted. I have only strength to write a few words." And, lower down, almost illegibly: "Morning. Intense cold. Much snow, which falls uninterruptedly; guides restless."

The five frozen bodies were drawn down the mountain in sacks, the six others never being found.

We, however, chose the other route from the Grand Plateau, the one which mounts to the ridge connecting the Dôme du Goûter with the central cone. Soon we reached the Rochers des Bosses and the Vallot Refuge, just below the summit of the Dôme (see pp. 890 and 892). This little hut and observatory are 14,320 feet in the air. They were planned by Vallot, a French mountain enthusiast, who, in 1887, performed the unprecedented feat of camping out under canvas on the very summit of Mont Blanc for three days and nights! I may mention the fact that Professor Tyndall, in 1859, had stayed one night on the summit, but his experiences with the cold and mountain-sickness were disagreeable.

Vallot's party could eat nothing those three days without the greatest distress, even a cup of tea producing disastrous effects.

On the third night they were caught

Photo by S. G. Wehrli

THE SUMMIT FROM THE DROMEDARY'S HUMPS

"Though the descent in general is not so slow or laborious as the ascent, in some places it is more hazardous. The descent to the Vallot Refuge was particularly disagreeable, as the ridge seemed far steeper as you looked down it than it did in climbing up. . . . The heat of the midday sun melts the surface crust on the slopes below, and our feet constantly sank into the porous substance at every step; so there was more danger of sticking fast and breaking our legs than of falling down precipices" (see text, page 808). The Vallot Refuge, snow-covered but dis-

in an electric storm, which literally caused their hair to stand on end, and sparks were felt all over their bodies, which were bathed in electricity. This experience on the summit caused Vallot to think about erecting a refuge near the top.

The transportation of building materials to such a height offered the greatest difficulties. One hundred and ten guides and porters were engaged, each of whom carried 35 pounds. Since 1891 the hut has been enlarged and a separate building for an observatory erected.

Here we stop for a short rest. Our guides try to eat a few morsels, but they soon think better of it and give up the attempt.

THE DROMEDARY'S HUMPS

From the refuge the route follows the crest of the ridge all the way to the summit, passing over the two camel-like mounds known as the "Bosses du Dromadaire," whence the route is called that of the "Bosses." Though the distance seems trifling, two hours of painful effort were still before us.

The air has now become so rare that even the stoutest guide is compelled to take breath every few steps. If you ever saw an asthmatic man trying to walk up hill while a paroxysm was on him, you can form some idea of the difficulty of this last part of the ascent. The heart thumps irregularly, the pulse goes up to 100, your knees knock together, and your poor legs seem unwilling to carry you. Your throat is parched, you feel suffocated, your chest seems to be loaded down with a great weight, and such a feeling of utter exhaustion!

And withal it is extremely cold, somewhat below zero, and a fierce cutting wind sweeping up from the Italian side. As long as we rested we felt less inconvenience, but as soon as we were again in motion our legs seemed like lead and it was almost impossible to drag our bodies higher. Where the ridge crosses the Bosses it is in places exceedingly steep—in some places even 45°, where each step had to be hewn into the ice—and at times it narrows to less than a foot in width, so that it was a difficult matter to rest. As each in turn lay down for a few moments on the slope, the others had to stand and hold him in position.

And part of the time we felt like proceeding on all fours, or even bestriding the crest, for to look down the precipices on either side made us nervous.

A slip might be disastrous, for being roped together one might drag all the others down with him, and if you fell you would bound from snow-ledge to snow-ledge for perhaps 2,500 feet on the French side to the Grand Plateau, and still further on the Italian side, and you might not find time to decide into which country you would like to go.

SENSATIONS AT THE MOUNTAIN TOP

At last, two hours after leaving the Grand Plateau, we are on the summit. And what do you think is the first use made of the glorious view after all these hours of toil? Do you open your eyes wide in astonishment at the wonderful sight? By no means! You shut them as tight as you can and throw yourself down on the snow in utter weariness of mind and body, resenting the impertinence of your guides, who urge you to look about. But it is too cold to sleep, and soon you are up trying to keep warm.

The view, if you have any desire to see it, is indeed incomparable. The panorama before you is immense; but everything is on such a grand scale, great agglomerations of plains and mountains, that all details escape you. Most of Switzerland, great portions of France as far south as Lyons, and the plains of Piedmont and Lombardy, in Italy, are spread out before you (see page 897).

The enormous size of the giant among mountains, which you have just ascended, impresses you. The entire Bernese Oberland, with its countless lofty peaks, is below you. At the end of the long Pennine chain, on the western pinnacle of which you are standing, is the sister summit, Monte Rosa, the second highest in the Alps, and just to its left the unforgettable form of the Matterhorn, with mountains still over it in the distance, and nothing gives you a more

Photo by S. G. Wehrli

A GLISSADE

"We enjoyed the sport of glissading down these slopes, where there was no danger of crevasses. Each seated on the snow, with his ice-axe for a rudder, would glide in a few minutes down a declivity which took an hour to climb up. Frequently those behind would overtake those in front; and, as all were tied together, it was great sport to roll together in a jumbled mass of flying legs and snow" (see page 898).

convincing idea as to the height you are on. The many peaks and aiguilles of the Mont Blanc range perhaps interest you more, for they are the only near things in the view; but, however lofty and imposing they may have looked from below, even the highest is now insignificant, for all are beneath you.

Yet I confess I scarcely took more time to enjoy this unique vista than it has taken to write these few words of description, for the cold was so intense that five minutes after arriving at the summit we were all ready to begin the descent.

THE MOST EXTRAORDINARY OBSERVATORY EVER BUILT

And I should not fail to speak of the Janssen Observatory at the summit, the boldest monument ever erected to the glory of science, situated here at the apex of Europe (see page 897). Dr. Janssen, late president of the French Academy of Science, procured the necessary funds and superintended its erection. As the summit of Mont Blanc is entirely composed of a vast mass of snow and ice several hundred feet deep, resting upon a cluster of granite pinnacles (small groups of rock appear just below the summit on three sides, the nearest, la Tournette, being only 171 feet below it), the observatory would have to be built upon the snow, and so every one received his proposal with incredulity. Though the snow at the top is constantly subsiding and feeding the glaciers below, the height of the mountain remains almost constant from the accession of fresh deposits. So it was not feared that the observatory would sink *into* the snow, but *with* it. M. Eiffel, of the Tower fame, was consulted, and he agreed to engineer the project if a rock foundation could be found.

With incredible difficulty a horizontal tunnel was driven into the ice, 49 feet below the summit, for a distance of 96 feet, in quest of rock, but the only stone encountered was a solitary plumstone! M. Eiffel then gave up the plan, but Dr. Janssen carried the tunnel 75 feet further, but with no better success.

The report of the engineer in charge gives a lively idea of the difficulties involved in this work—how the workmen suffered from the cold and mountain sickness and mutinied, most of them refusing to work at any price.

HOW THE OBSERVATORY SANK IN THE SNOW

But the Doctor was still undismayed and went on with his original plan of erecting a building on the snow. In the winter of 1891-1892 the observatory was constructed, partly of wood and partly of iron, at Meudon, near Paris, taken to pieces and transported to Chamonix. At the end of September one-fourth of the material had been carried as far up as the Petits Rochers Rouges, only 750 feet below the summit, and the rest as far as the Grand Mulets. At the beginning of the next summer the part left near the summit was found to be buried in 25 feet of snow. By the end of the season the frail structure was up, though it was not completely finished till 1894. The heavier parts were slowly hauled up the final slope by the help of little hand windlasses.

That the apprehension as to its stability was only too well founded is now apparent. When I visited it the roof was was nearly level with the snow surface of the summit, so that we lay down upon it to rest. Only the ironwork tower was above the snows. The interior seemed almost completely filled with snow and the whole structure is in a dilapidated condition. I understand that the observatory has since been restored at great expense.

A huge instrument, called a meteorograph, costing $3,500, has been installed. It is wound up to run eight months, the period of time during which no one can visit the observatory, and it registers barometric pressure, maximum and minimum temperatures, force of the wind, etc. We now know how cold it may get at this great altitude; a temperature of 54.4 below zero (Fahrenheit) has been registered by the thermometer outside the observatory. However, it must get colder than that, for if I remember rightly, the thermometer on the top of the far lower summit of our

Photo by G. P. Abraham

THE GRAND PLATEAU AND THE SUMMIT OF MONT BLANC

"Imagine an oval ravine, as it were, sloping very gently upward for about 2 miles to the base of a conical peak, the summit of the mountain, its sides being formed by lofty walls of snow-covered rock, its entrance guarded by two almost perpendicular walls, and its bottom full of snow that has fallen into it for ages from the summit at its upper end and the ridges at its sides, and you have some idea of what the Grand Plateau of Mont Blanc is like. It is the head of the long snow-slope [name] Couamis and [illegible] just below the summit" (see page 884).

Photo by S. G. Wehrli

THE SUMMIT OF MONT BLANC

"The panorama before you is immense; but everything is on such a grand scale, great agglomerations of plains and mountains, that all details escape you. Most of Switzerland, great portions of France as far south as Lyons, and the plains of Piedmont and Lombardy, in Italy, are spread out before you. . . . And I should not fail to speak of the Janssen Observatory at the summit, the boldest monument ever erected to the glory of science, situated here at the apex of Europe" (see page 893).

Mount Washington has reached 50 below zero.

ASCENDING MONT BLANC ON A SLEDGE

The energy and courage displayed by the veteran astronomer in carrying out his plan in the face of almost insuperable difficulties was indeed remarkable, and the more so as he was nearly 70 years old and so lame he could not climb a yard nor even walk easily on the level; yet he has had himself dragged to the summit three times on a sledge. During his first visit he stayed four days near the summit, making observations.

Though the descent in general is not so slow or laborious as the ascent, in some places it is more hazardous. The descent to the Vallot Refuge was particularly disagreeable, as the ridge seemed far steeper as you looked down it than it did in climbing up. We got to the Grand Plateau about eleven o'clock. The heat of the mid-day sun melts the surface crust on the slopes below, and our feet constantly sank into the porous substance at every step, so there was more danger of sticking fast and breaking our legs than of falling down precipices.

We enjoyed the sport of glissading down these slopes, where there was no danger of crevasses. Each seated on the snow, with his ice-axe for a rudder, would glide in a few minutes down a declivity which took an hour to climb up. Frequently those behind would overtake those in front; and, as all were tied together, it was great sport to roll together in a jumbled mass of flying legs and snow.

In five hours after leaving the summit we were at the Grand Mulets, where we stopped for an hour's rest. In three hours more we were again in Chamonix, with Mont Blanc behind us! In all we had been roped together 14 hours, and had suffered no mishap.

SKI-JUMPING AT GRINDELWALD Photo by W. Nehrkorn

In winter tourists from every part of the world assemble to enjoy the winter sports for which the little town offers an unrivaled setting. Conspicuous among these are ski-running and jumping, a sport of Scandinavian origin, but now thoroughly acclimatized in Switzerland, though introduced as recently as 1902.

Photo by S. G. Wehrli

THE VISP NEAR ZERMATT

Zermatt stands at the foot of the mountains at the end of the long, narrow valley through which the Visp flows. Above the town and dominating the whole valley rises the majestic peak of the Matterhorn. Zermatt is a little community of about 500 souls, but it is crowded, or rather overcrowded, with visitors during a great part of the year.

Photo by S. G. Wehrli

THE MATTERHORN

This immense rock pinnacle, soaring 14,782 feet in the air, is one of the most difficult mountains to climb in all Switzerland. It is among the chief peaks in the Pennine Alps, and lies about 6 miles from Zermatt. One of the greatest Alpine tragedies is associated with the first successful ascent in 1865; for, after scaling the summit, four of the party were hurled to their death during the descent.

Photo by S. G. Wehrli

CHALETS NEAR ZERMATT

The term *chalet,* which is applied to the picturesque wooden houses found in Swiss villages, properly belongs to the rough mountain huts shown in the picture. These huts are used by the cowherds and cheese-makers, who accompany the cattle during the long summer visits to the high Alps, where the herds pasture.

Photo by G. P. Abraham

THE VILLAGE CALVARY

Almost every village in the Catholic cantons has its Calvary, and in the country wayside shrines are not uncommon. There are numerous villages renowned for the excellence of the wood-carving they produce, and in these the Calvary is often of great artistic merit. In others the design may be fantastic and the execution crude, but there is always a quaint touch which redeems it from the commonplace.

Photo by S. G. Wehrli

A STREET IN BRIENZ

This little city, standing on the banks of a lake of the same name, is famed for the picturesqueness of its streets and the beauty of surroundings. Behind the town is the Brienzer Rothorn, 7,715 feet high, which can be ascended by rail. Brienz is the center of the wood-carving industry of the Bernese Oberland.

Photo by Donald McLeish

ASCENDING THE ALLALINHORN

The road from Zermatt to Saas leads over the Allalin Pass, at the height of 11,713 feet, which is always covered with snow. Rising above the pass is the Allalinhorn, from whose summit, 13,236 feet above the sea, can be seen many of the highest peaks in the Alps.

Photo by Donald McLeish

THE RIMPFISCHHORN FROM ALLALINHORN

The Rimpfischhorn, one of the higher peaks of the Pennine Alps, is 13,790 feet high. In this range are all the loftiest summits in the Alps, with the one exception of the Finsteraarhorn, in the Bernese Oberland. This photograph, taken from the Allalinhorn, itself 13,236 feet high, shows the topmost peak of the Rimpfischhorn. Note the band of climbers roped together in the foreground.

Photo by S. G. Wehrli

ON THE TOP OF THE BREITHORN

This peak is situated on the frontier of Switzerland and Italy and rises to the height of 13,685 feet. From its summit a magnificent panorama of the mountains can be obtained. In the center of the picture rises the Matterhorn; to the left the sharp point of the Dent d'Herens (13,715 feet); between them and far away in the distance the Dents du Midi (10,696 feet); to the right is seen the Dent Blanche (14,318 feet), with the Grand Cornier (13,022 feet) next to it.

Photo by S. G. Wehrli

A CHARACTERISTIC VALLEY IN THE BERNINA ALPS

The Bernina Alps run along the border-line between eastern Switzerland and Italy. The picture shows the Val Bondasca, dominated by the Pizzo Badile (10,863 feet), and the Pizzo Cengalo (11,070 feet). These Alpine valleys on the Italian side are famous for their grapes and still more famous for their wine. Each valley seems to produce a wine of a different character to that of its neighbor, a few miles away. The best known of these valleys, both for its scenery and its wine, is the Valtellina, where the Bernina Alps end toward the south.

Photo by G. P. Abraham

CLIMBING THE WETTERHORN

This is one of the imposing mountains of the Bernese Oberland and offers perhaps the most difficult rock-climbing to be found in the Alps. It stands near Grindelwald, and on that side presents a stupendously precipitous face, up which an ascent can now be made by a cable elevator, which climbs 5,500 feet up the mountain side. The Wetterhorn consists of three distinct peaks—the Mittlehorn (12,166 feet), Hasli-Jungfrau (12,149 feet), and the Rosenhorn (12,110 feet).

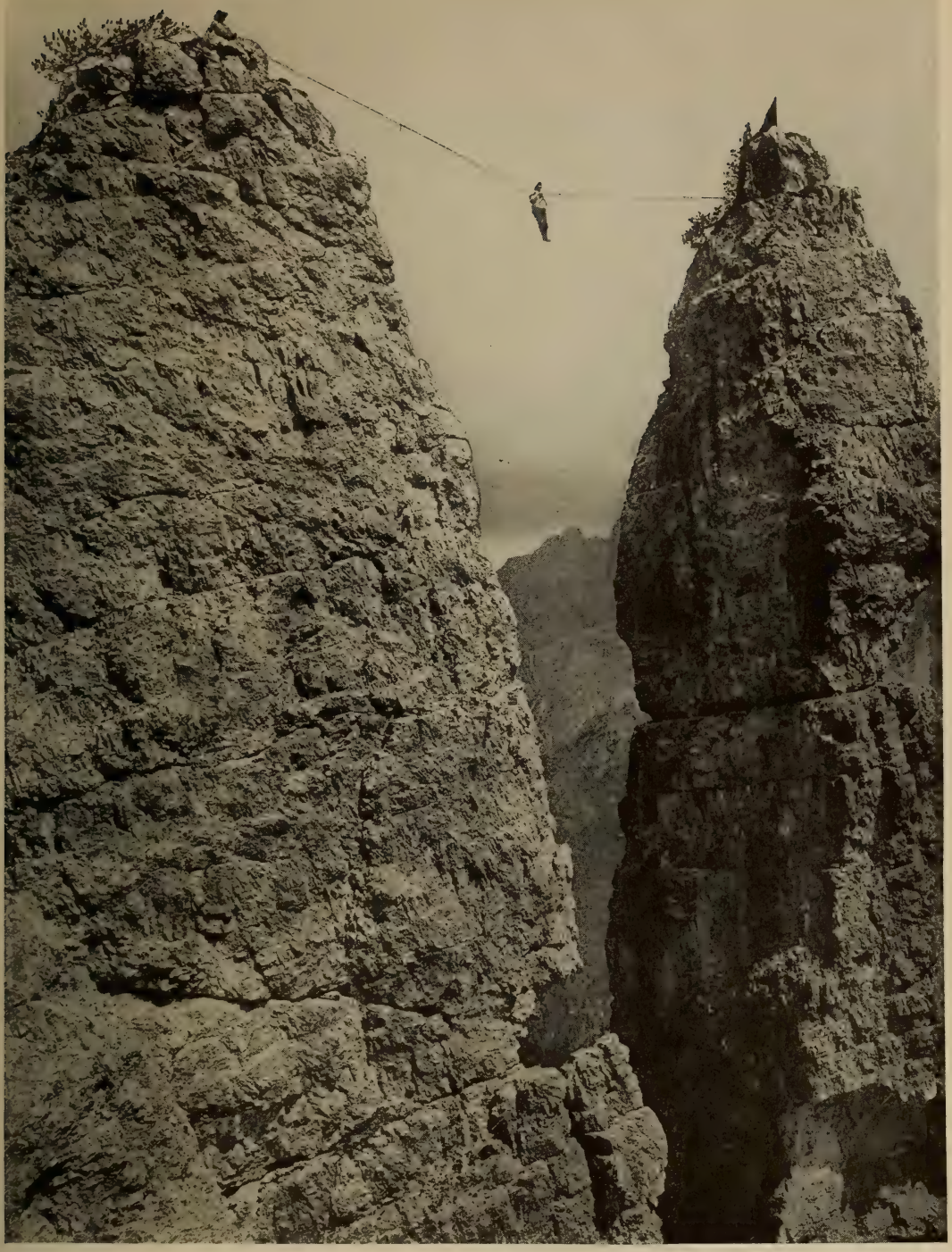
Photo by G. P. Abraham

CLIMBING A CHIMNEY ON THE EIGER

The Eiger (13,042 feet), like most peaks in the Bernese Oberland, affords a good deal of difficult rock-climbing. These chimneys, as their name implies, are narrow clefts or funnels between great rock masses. They are often very hard to scale, as the sides may be absolutely vertical. The chimney in the picture is not by any means a difficult one, but it suggests the fact that mountain-climbing is a pastime only for those who love the strenuous life.

A SLIDING PARTY

A convenient method of negotiating short snow fields when descending a mountain is by sliding down them, as shown in the picture. It should be noted that this form of descent is apt to be somewhat painful should the snow be too hard or the distance too long.



GUGLEA EDMONDO DE AMICIS, SWITZERLAND: CLIMBED FIRST BY PRAZ ON JULY 17, 1906

Rock-climbing is perhaps the most difficult branch of mountaineering, as a successful climb calls for the exercise of a rare combination of qualities. The rock-climber must possess a steady head, a sure foot, considerable gymnastic skill, and, above all, careful judgment. Much depends upon the climber's skill in estimating the firmness of a rock upon which his weight will be thrown. Many loose rocks are sufficiently firm to bear a man's weight if he knows how to negotiate them without jerking. Some idea of the difficulties of rock work can be formed from this picture, where the least mistake in swinging between the two peaks means instant death.

Photo by S. G. Wehrli

THE CASTLE OF CHILLON

Famed alike for its beautiful surroundings and romantic interest, this castle on the shores of the Lake of Geneva is perhaps the best-known building in Switzerland. Byron, who immortalized it in his "Prisoner of Chillon," has been proved to have been entirely ignorant of the story of Francis Bonivard, who was imprisoned here from 1530 to 1536; yet, by a curious coincidence, he gives to his prisoner the historic name.

Photo by S. G. Wehrli

AT THE QUAY: MONTREUX

Few places on the shores of the Lake of Geneva have greater popularity than this group of villages, which is known collectively as Montreux. It is a deserved popularity, for all nature has conspired to endow this lake with an extraordinary charm which has drawn thither some of the most famous poets and writers. Among its enthusiastic admirers were Shelly, Rousseau, Voltaire, Gibbon, Madame de Staël, and Lamartine, while Byron wrote some of the finest stanzas of Childe Harold under the inspiration of its beauty.

Photo by S. G. Wehrli

THE AXENSTRASSE

This road, one of the most curious and picturesque in Europe, runs from Brunnen to Flüelen along the shore of the Lake of Lucerne. It is of strikingly bold construction, a great part of it running through tunnels hewn in the solid rock. The finest views along the road are obtained near the famous tunnel through the Axenfluh, which is pierced with windows which afford glimpses of the lake, lying 360 feet below.

Photo by S. G. Wehrli

SISIKON AND URI-ROTHSTOCK

Sisikon is a tiny village standing on the shore of the southern arm of Lake Lucerne and affording a fine view of Uri-Rothstock, towering 9,620 feet above the sea. The canton of Uri, in which the village is situated, is reputed to have one of the most democratic governments in the world, every legislative enactment being voted on directly by all the citizens assembled in what is called the *Landesgemeinde*, at which every man of full age has the right to be present. Uri is mainly a cattle-raising and dairying country, having but few industries. It is one of the three original cantons which united in forming the Swiss Confederation in 1291, from which Switzerland dates her independence.

Photo by S. G. Wehrli

THE CHURCH AT GRINDELWALD

Famous both as a summer and winter resort, Grindelwald stands at the head of a beautiful sheltered valley rich in fertile meadow land. The whole country round the village is full of wild and romantic scenery and majestic mountain landscapes. The great Grindelwald Glacier is a source of attraction to the tourist, while the Eiger, the Wetterhorn, and the Mettenberg are the magnets which draw the mountaineer to this picturesque spot.

A FIELD OF WILD NARCISSUS AT MONTREUX

Montreux, charmingly situated on the shore of the Lake of Geneva, is one of the most popular resorts in Switzerland, both in summer and winter. At the end of September numbers of visitors arrive to take the so-called "grape cure," which consists of the not unpleasant prescription of eating an unlimited amount of the excellent grapes which grow in profusion on the hillsides above the town. Near Montreux are the equally popular resorts of Clarens, Territet, Veytaux, and Vevey—the scene of Rousseau's *Nouvelle Hélöise.*

LAUTERBRUNNEN

This pretty, scattered village, lying on both banks of the Lütschine, stands in a deep and rocky valley surrounded on all sides by mountains of such height that in winter the sun's rays do not reach it before 11 o'clock in the morning. It derives its name—"Nothing but springs"—from the numerous streams that descend from the mountains and from the springs that rise at their base. In the picture can be seen the famous *Staubbach,* or "spray brook," which leaps 980 feet over a rocky crag, its waters being converted into a silvery veil of spray before reaching the ground.

Photo by S. G. Wehrli

THE STATION AT WENGERNALP

This spot, which is nothing but a railroad station and a hotel, lies at the foot of the Jungfrau, the highest peak of which is not visible in the picture. From this point the traveler can see snow and ice avalanches, which on warm summer days occur several times in an hour. Watching these great snow masses descending from rock to rock on the mountain side like huge white cascades has an indescribable fascination which draws many tourists to Wengernalp, which also affords one of the most celebrated views in Switzerland, lying as it does at the height of over 6,000 feet above the sea.

Photo by G. P. Abraham

MORNING MIST ON THE WETTERHORN

Edward Whymper, one of the greatest of Alpine pioneers, thus describes the effect of these mists upon the observer: "No views create such lasting impressions as those which are seen but for a moment, when a veil of mist is rent in twain and a single spire or dome is disclosed. The peaks which are seen at these moments are not, perhaps, the greatest or the noblest, but the recollection of them outlives the memory of any panoramic view."

Photo by S. G. Wehrli

A SEA OF CLOUDS

One of the grandest and most inspiring sights in the Alps is that obtained from the mountain-top in the early morning. The valleys are filled with clouds which stretch away to the horizon like a vast sea; here and there some isolated mountain-top thousands of feet high emerges like a tiny island, while the tops of the vast Alpine chains appear as a rock-bound, snow-clad coast. Over all the rising sun sheds a stream of light, producing a color scheme which defies description.

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A SWISS FARM

This typical Swiss homestead stands in the valley beneath the Monch and the Jungfrau. Notice the rocks used to weigh down the wooden roof—a precaution rendered necessary by the windstorms, which in winter sweep down from the mountains with terrific violence

Photo by S. G. Wehrli

THE EVENING HOME-COMING

As befits a pastoral country, the herds play an important part in Swiss peasant life and receive a greater amount of attention than falls to the lot of cattle in other parts of the world. When pasturing in the valleys, they return home in the evening to pass the night in the stables, which stand near or under the farm-house.

Photo by Alix Bodenheimer

MARCHING OFF TO THE ALPS

To most people the term "the Alps" means the high snowy mountains of Switzerland, but to the dweller in the valleys of that country the term has a very different and specific meaning. To them the Alps mean exclusively the summer pastures situated on the mountain sides above the valleys. These mountain pastures are essential to the pastoral districts, for the valleys do not produce sufficient fodder to support the cattle all the year round. In German Switzerland the Alps are the center round which the whole pastoral life of the people turns. The Alps belong to the commune, and the person having a right to pasture his cattle on any particular Alp cannot sell his right without selling the house and ground in the valley below to which the right is attached.

ALPINE PASTURES

In the spring all the cattle in Switzerland are taken up the mountain sides to pasture on the Alps. The lower Alps are visited twice—at the beginning and end of the season—while the upper Alps receive but one visit. Hay is never mown on the true Alps, except in places which are inaccessible to the cattle. It is then called wild hay, and belongs not to the owner of the Alp, but to the person who mows it. The pastures lying between the farms and the Alps are not communal property and are known as *Voralpen*. These are seldom pastured, but the hay is mowed and carefully stored for winter use. During the winter the cattle are stabled in buildings attached to the homesteads in the valley.

A RELIGIOUS PROCESSION IN APPENZELL

Each year the girls of Appenzell don the quaint traditional costume of the canton for taking part in the annual procession of the Virgin through the streets of the little town, which is a noted cure resort and tourist center. Appenzell is one of the oldest cantons in the Swiss Confederation, dating from 1513. It is divided into two half cantons. Inner Rhodes, of which the capital is Appenzell, is mainly agricultural and its inhabitants almost entirely Roman Catholics. Outer Rhodes, with its capital—Trogen—is devoted to cotton weaving, while its people are all Protestants.

Photo by S. G. Wehrli

A HOUSE AT INTERLAKEN

This house, known as "The House of the Cool Wine," is an admirable example of Swiss architecture. Note the masonry base, in which are situated the stables and cellars; the wooden superstructure, with its outside staircases and balconies which serve as passages, while crowning all is the great tiled roof, with its wide projecting eaves.

Photo by S. G. Wehrli

PICTURESQUE YOUNG GOATHERDS

Goats play almost as important a part in Swiss life as the cattle, much of the more palatable cheese being made from their milk. Note the picturesque costume of the boys—the gray breeches; the green vest, with its silver buttons; the feather and flower trimmed hats, and the jaunty silver ear-ring worn in the right ear.

PASTORAL SIMPLICITY

The traveler who wanders off the beaten tourist track, especially in the higher Alps, will frequently come across such scenes as this, which shows the simple peasant as he is, living on and with his flocks and herds. In all Europe there is no class more kindly, good-natured, and honest than the hard-working, unspoiled Swiss peasantry. Note how anxious the goats are to appear to best advantage in the picture.

AT THE DOOR OF THE SPEICHER

A *speicher* is a small hut built upon four stone legs (to secure the contents from mice), in which the cheese made during the summer visit to the Alps is stored. The cheese-makers, known as *sennen* or *fruitiers*, and their families follow the cattle from Alp to Alp all through the summer, turning the milk into the well-known Gruyère cheese, better known all through America as "Swiss cheese."

A CALL FROM THE HEIGHTS

The man is giving the call known as the *Juchzer,* a series of notes which, when properly produced, carries for an incredible distance. Another famous cry is the *Ranz des Vaches,* a curious plaintive melody used by the herdsmen to call in the cattle at milking time. Note the old-world costume of the girls—the velvet corsage with its silver bosses, the silver chains and pendants attached to the shoulder straps, and the embroidered velvet yoke.

Photo by S. G. Wehrli

AN APPENZELL GIRL

The Inner Rhodes, or half canton of Appenzell, is reputed to be the most conservative district in Switzerland, and it has retained many old customs and costumes; those of the women, as can be seen from the picture, are very quaint and attractive. The industries of the canton, most of them carried on in the homes of the country folk, are the manufacture of cotton goods, muslins, and embroidery, the latter being in a very flourishing condition.

Photo by Schild

AT THE SPINNING-WHEEL

Although Switzerland is perhaps the most tourist-ridden country in the world, the constant succession of visitors has not succeeded in spoiling the charm and simplicity of the peasant life. Off the beaten track can be found whole villages whose inhabitants lead the same uneventful patriarchal life that their fathers led before them. Handicrafts are hereditary in certain families—wood-carving in one, clock-making in another, and so on. In many of the more remote communities the peasants grow their own flax, spin their own thread, and weave their own linen today just as their forefathers did in the middle ages.

Photo by Nikles

WINTER SPORTS AT GRINDELWALD

Of recent years Switzerland has become a winter playground, as it offers unrivaled facilities for all winter sports. Skating, curling, ski-ing, tobogganing, can all be enjoyed to their fullest extent at Grindelwald, which consequently enjoys a succession of visitors all the year round. Curiously enough, there is no village of Grindelwald, properly speaking; the cluster of houses round the church was originally known as Gydisdorf, but the name of the valley came to be applied to the new settlement, and the original designation of the village is now almost completely lost.

Photo by S. G. Wehrli

A LUCERNE MILKMAN

Lucerne lies in an unrivaled situation on the shore of the lake of the same name. On the water front the city shows all the hall-marks of a popular travel center, with its palatial hotels, shops, and promenades. Behind all this lies the real Lucerne, a quaint old mediæval town, where the ordinary traveler seldom goes. The ancient wall, with its many watch-towers, still encloses the city, which has many quiet winding streets and picturesque gabled houses like those shown in the picture. Note the dogs used as draft animals.

EIGER, MÖNCH, AND JUNGFRAU

Photo by S. G. Wehrli

Some miles from the village of Brienz, in the Bernese Oberland, on the road to Grindelwald, stands a mountain called The Little Scheidegg, noted for the magnificent panorama it affords of the Eiger (13,042 feet), Mönch (13,468 feet), and Jungfrau (13,670 feet). Note the characteristic feature of all Alpine scenery shown in the picture, the three great glaciers flowing slowly, imperceptibly, yet surely down the sides of the mountains. The hut in the foreground is one of the *chalets* or *Sennhütten*, in which the herdsmen live during the time that the cattle are pastured on the mountain side in summer.

Photo by S. G. Wehrli

AT THE SUMMIT OF THE JUNGFRAU

This mountain is one of the most famous in all Switzerland. It is 13,670 feet high and was first climbed in 1811. The view from its summit is one of the wonders of the world, and to render this easy of access a railway has been built up the sides of the mountain, which, when completed, will land the traveler within 242 feet of the summit. At 10,000 feet above the sea-level is one of the strangest railway stations in Europe. It is cut out in the living rock, and the only sources of light are the openings cut in the side of the mountain. From this point the traveler can overlook the whole of northern Switzerland, the vista stretching away until it reaches Alsace and Baden, in Germany.

THE SUMMIT OF TITLIS

This is one of the most accessible, though not one of the highest, peaks in the Bernese Oberland, as it rises to a height of 10,627 feet, or nearly 4,000 feet lower than Finsteraarhorn, the ranking mountain of the range. Titlis lies between Interlaken and Engelberg, and is most conveniently ascended from the latter town.

Photo by S. G. Wehrli

A VIEW OF THE SCHRECKHORN

This picture shows the Shreckhorn (13,386 feet), one of the great mountains dominating the exceedingly picturesque village of Grindelwald. The view is taken from the upper névé or snow field on the Fiescherhorn, itself only 101 feet lower at its highest point. Grindelwald has become a favorite tourist center, and from it can be seen to best advantage three other famous peaks of the Bernese Oberland—the Eiger (13,042 feet), Wetterhorn (12,166 feet), and Mettenberg (10,194 feet). The village is now not only a summer resort, but it also attracts a large number of visitors, who go there for winter sports.

Photo by Donald McLeish

THE KONIGSPITZE FROM THE EISSESPITZE

In the eastern Alps there is but one other peak of greater height than the Konigspitze (12,655 feet), and that is Ortler, which is less than 200 feet higher. The Konigspitze is unsurpassed by any other peak in the Austrian Tyrol in grandeur.

Photo by Donald McLeish

PIZ PALÜ FROM THE DRANOLRYRYA

One of the loftiest points in the Austrian Tyrol is Piz Palü, 12,835 feet above the sea. The mountain stands in the south of the Tyrol, near the Italian frontier

KLEINGLOCKNER AND SCHARTE

The Grossglockner, of which these peaks are offshoots, is the highest mountain in the Alps of the Central Tyrol, rising to the height of 12,461 feet

GEMS OF THE ITALIAN LAKES

By Arthur Ellis Mayer

THERE are many places of beauty and interest in Europe, but few that will compare in charm and grandeur with the Italian lakes. Here nature seems to have opened her storehouse and lavishly displayed her great work; for there are few places where one has such a wonderful combination of air, sky, water, mountains, and vegetation as well as embellishments by works of man, both ancient and modern. I mention the sky, for here we have the azure blue color found in Italy, but rarely, if ever, in our own country; this, when reflected in the deep emerald waters of the lakes, with the snow-crowned mountains, palm trees, villas, and palaces, makes a picture in colors never to be forgotten.

There are many lakes located in the extreme northern part of the country, some forming a portion of the boundary line between Italy and Switzerland. The most beautiful of these, however, are Lake Como, Lake Lugano, and Lake Maggiore, and to these we will devote our special attention for a short while.

LAKE COMO

It is but a short journey by rail from Milan to the shores of Lake Como, considered by many to be the most beautiful of all the lakes in northern Italy. This charming lake was one of the favorite haunts of the old Romans, and was known among them as Lacus Larius, but is now the summer residence of the Milanese aristocracy. It is 38 miles long, one to three miles wide, and situated among lofty mountains, some rearing their peaks 5,000 feet above its placid waters.

The journey up the lake is one of the most enjoyable scenic treats it is possible to conceive. At one moment it appears as a wide river, the banks being lined with verdant slopes and terraces for the growth of the vine, while at the next it opens out as a vast stretch of land and water with unrivaled natural effect.

As the boat glides swiftly onward, wonderful glimpses are to be had of the snow-white villas and grim turreted castles peeping out of the forest and semi-tropical gardens. Another interesting feature is the color of the foliage, as the shores are bordered with the dull gray-green of the olive, while a little higher up is the brilliant green of the walnut and chestnut, which harmonize so well with the deep-blue sky and placid waters. There are many peninsulas and promontories jutting out into the water, and on these are the odd and quaint villages surrounded by their gardens, palms, and olive groves.

THE GEM OF THE LAKE

On one of these stands Bellagio as a jewel in the crown of nature, situated about half way up Lake Como, where the southern extremity of the lake divides into two bodies of water, the other being called Lake Lecco (see page 949). It is a charming location and the town no less interesting, for here we have the busy arcades, where the merchants display their wares of local industries.

These consist principally of manufactured woodwork made into inlaid boxes, picture frames, and small articles of various forms, and silks made into blankets, scarfs, etc. It is indeed very interesting to see the old-fashioned processes by which these are made and the marvelous dexterity with which the peasants use their hands.

Several streets leading to the upper portion of the town consist of ancient stone steps, lined on both sides with shops and homes of small industries. At the top of one of these flights of steps stands the old church with the quaint chimes that mark the hours and quarter hours now as it did in ages past; these are answered by others across the waters from numerous villages dotted along the shores. The hotels are charmingly situated among beautiful palm trees and roses, making a very picturesque appearance.

Following a zigzag path up the side of the hill, a few minutes' climb brings into

Photo by S. G. Wehrli

MONTE CAPRINO AND THE CHURCH OF CASTAGNOLA

Opposite Lugano is the village of Castagnola and Monte Caprino, famous for its *cantine* or rock cellars. This is a favorite resort of the dwellers in Lugano, who on Sundays and holidays flock there to enjoy the far-famed wine, known as Asti, of which the cellars always contain a plentiful store.

Photo by S. G. Wehrli

SANTA CATERINA DEL SASSO

Half way down the eastern bank of Lake Maggiore stands the monastery of Santa Caterina, perched on a rocky crag overhanging the blue waters. Embedded in the roof of the abbey church is a great boulder that fell from the heights above in the 17th century. From this point perhaps the finest views of the Borromean Islands can be obtained.

view the Villa Serbelloni, a graceful structure located near the edge of the hill and built on several terraces. The luxuriant palm trees, with their yellow clusters of dates and green leaves, stretch out their graceful arms in all directions.

Here a beautiful park is laid out, which is traversed by numerous shaded walks and grottoes, where one may rest in comfort, protected from the intense rays of the mid-day sun. A wonderful view is to be had of the several bodies of water stretching out below, while in the distance is discernible the cap of everlasting snow of the higher Swiss Alps.

VILLA CARLOTTA

There are many pleasant little excursions in all directions from Bellagio, both by land and water. One of these interesting little trips for the sojourner is to cross the lake to the Villa Carlotta, which is the property and summer home of the Duke of Saxe Meinigen. Here we have one of the most magnificent gardens it is possible to conceive. The coloring of the flowers that grow in every nook and corner are beyond all description, and should one unfamiliar with this country see these colors reproduced on canvas they would certainly be declared overdrawn. The predominating flower, however, is the azalea, which seems to bloom in almost every conceivable color.

Near the garden is a beautiful wood, and as one walks through the dense semi-tropical growth on all sides of the path attention is at once called to the quantities of orchids of many hues which may be seen clinging to the trees.

From Bellagio it is but a few minutes by steamer to Menaggio, and on this trip we see for the last time the square-rigged sailing vessels and the peculiar characteristics of the barcas, or boats which are made serviceable in all kinds of weather by spreading canvas over hickory arches fastened on either side to the bulwarks.

Menaggio is a quaint little town, but the spirit of commercialism is rather more apparent than at other points (see page 950). Here we take a steam tram, which winds up the side of the mountain, and as one looks backward from the heights the silent town of Bellagio can be seen nestling at the base of the bold promontory, with the white buildings of the Villa Serbelloni above. For a time the train follows the banks of a wild and rushing mountain torrent which flows into Lake Como, while later it descends on the brink of a great gorge containing a similar rushing stream, until Porlezza, on the shore of Lake Lugano, is reached.

LAKE LUGANO

This lake, being much smaller than Lake Como, is but sixteen miles long and two broad, differing very greatly from the latter in scenery, as we find the densely wooded mountains dipping precipitously into its waters, while a great sense of stern solitude seems everywhere to prevail. The deeply serrated tops of the snow-clad mountains seem to protrude far into the sky, often delighting the eye with beautiful clouds hovering about their heads.

A noted change in vegetation occurs the moment the Bay of Lugano is entered: instead of the rough and rugged variety, it is of a rich and thriving nature, vying with the neighboring lakes.

First is noticed Lugano Paradiso nestling at the foot of the slopes of Mount Salvatore; and a little farther on the town of Lugano itself, which is delightfully situated, enjoying a very equable climate, being mild in winter, yet avoiding the excessive heat of the long, hot summers (see page 951).

There are several things that make a halt here very enjoyable, both from a historic and scenic standpoint. Our very dwelling, the hotel, has figured prominently in history of ages past, being a convent till suppressed in 1848. The town is quite old, and among its other treasures is the Church of San Lorenzo, having a wonderful decorated marble façade in early Renaissance style, and the convent chapel of Santa Maria Degli Angeli, containing most beautiful frescoes by Luini.

A few hours spent in a trip by a cog railway to the top of Mount Salvatore repays one very well by the wonderful view, spreading out in all directions, and from its summit, on a clear day, many of the lakes of northern Italy may be seen, including those of Garda, Orta, and Varese.

Photo by S. G. Wehrli

THE CHURCH AT ORIA ON LAKE LUGANO

Switzerland is a trilingual country, speaking French, German, and Italian. Some of its inhabitants use all three. The canton of Ticino, the southernmost in Switzerland, is the only one, however, which is completely Italian in nature and in speech. One of the most striking contrasts in Europe can be found by passing through the St. Gothard tunnel. On the north everything is German-Swiss; the houses are typical wooden Swiss chalets, and the costumes of the people show the Teutonic influence. A few minutes in the train and all is changed. The houses are now the picturesque white structures of southern Europe; the churches, the costumes, and the speech are all entirely Italian. The vegetation is also different in character, and here are found the mulberry, almond, olive, and orange. Oria was for many years the home of the Italian poet, patriot, and novelist, Antonio Fogazzaro, who is known to American readers from his novel, "The Saint."

Photo by S. G. Wehrli

LAKE COMO FROM SALA

While not the largest, Lake Como is certainly the most beautiful of all the Italian lakes. Here is every element of natural beauty—the clear, blue waters of the lake, the lofty mountains with the snow-clad peaks of the Alps rising behind them, the indescribable tints of the trees, the vineyards and the olive groves, while over all is the soft blue of an Italian sky. Poets from the time of Virgil have sung its charms, and all that art could add to nature has been done to increase its attractions. Its banks are gay with luxuriant gardens, in which stand the villas of the Milanese aristocracy, and every few miles finds some quaint white village or town.

Photo by Arthur E. Mayer

BELLAGIO

"On one of these stands Bellagio as a jewel in the crown of nature, situated about half way up Lake Como, where the southern extremity of the lake divides into two bodies of water, the other being called Lake Lecco. It is a charming location and the town no less interesting, for here we have the busy arcades where the merchants display their wares of local industries" (see page 943).

Photo by Arthur E. Mayer

LAKE COMO AT MENAGGIO

Menaggio is a quaint little town enjoying a marvelous view over the lake, and here the effects of the winds peculiar to this sheet of water can best be observed. During the morning the wind, known as the *Tivano*, blows from the north; each afternoon it veers to the south, when it is called the *Breva*. This change takes place daily with singular regularity; but, like other Alpine lakes, Como is not free from sudden and violent storms.

Photo by S. G. Wehrli

LUGANO

Lugano, the largest town in the Canton Ticino, stands amid wonderful scenery. It enjoys, perhaps, one of the most charming situations in Europe, lying at the foot of Monte Brè, with its cherry and almond trees and vine-covered slope, amid which nestle picturesque white villas. To the south it is dominated by Monte Salvatore (3,004 feet), while it fronts upon the head waters of the beautiful mountain-fringed lake. Despite its Swiss allegiance, Lugano is thoroughly Italian in appearance and character.

Photo by Arthur E. Mayer

ISOLA BELLA FROM STRESA

"Previous to 1670 it was nothing but a barren rock, without vegetation and subjected to the washing of the waves, which had dashed against it for centuries, almost severing it in twain. At that time Count Borromeo started the great task of making it into the fairy place it is today. . . . Thousands of boat-loads of rich earth were brought from the mainland and distributed over the rocks in sufficient depth to insure vegetation its proper nourishment. This being accomplished, the chateau was built and finished in a lavish manner" (see page 956).

Photo by Arthur E. Mayer

THE TERRACED WALKS OF ISOLA BELLA

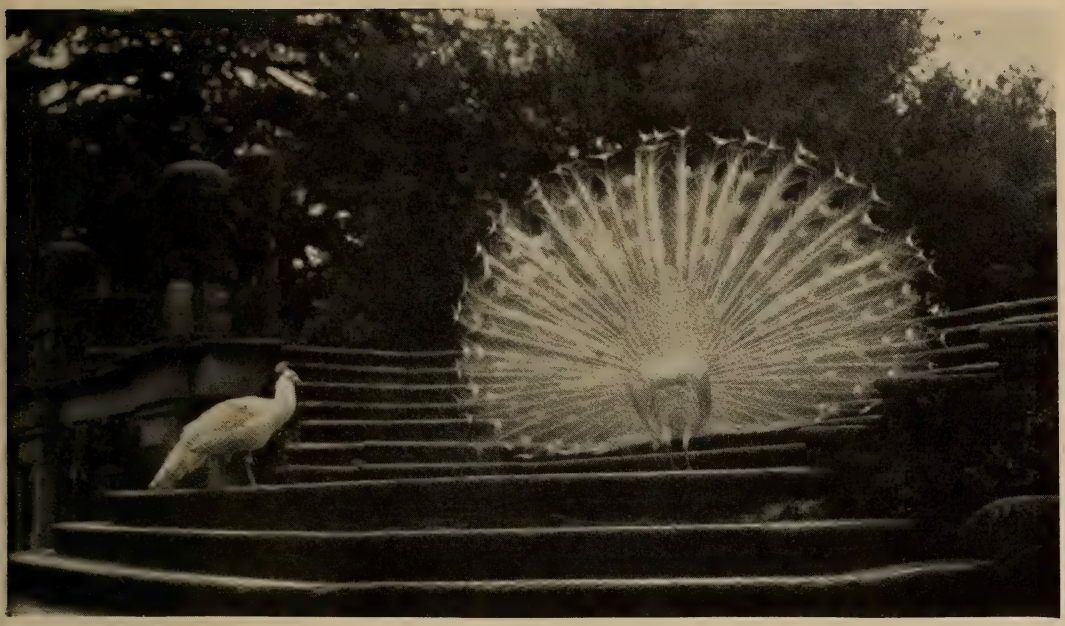
Isola Bella, the most famous of the Borromean Islands, is the gem of the Italian lakes. Originally a barren rock, it was transformed about 1670 by Count Vitaliano Borromeo, who made it his summer home. The magnificent gardens, rising in ten artificial terraces, 100 feet above the lake, are stocked with a wealth of beautiful trees—camillas, oleanders, magnolias, cypresses, cedars, and palms. The chapel of the chateau contains the exquisite Renaissance tombs of members of the Borromeo family, who were powerful nobles of Milan.

A PEACOCK OF ISOLA BELLA

Among the terraces and the beautiful shaded walks of the Isola Bella strut a flock of pure white peacocks, which seem ever ready to welcome the visitors and display their beautiful snow-white plumage. No Italian who owns a formal garden considers his domain complete without one or two of these graceful birds.

A BIRD ONCE SACRED

The peacock has been esteemed for its beauty from the earliest times. It was, among the Greeks, considered sacred to the Goddess Hera, and there are constant references to it among the Greek poets. King Solomon imported it into Palestine to add to the magnificence of his court at Jerusalem.



HUSBAND AND WIFE

The magnificent plumage of the peacock belongs only to the male, and it may be noticed that the female to the left of the picture is far less handsome than her husband, who presents us with a back view of his outstretched tail. These birds were once highly esteemed as food, and in the middle ages always figured at the most sumptuous banquets, roasted, but in all the glory of their gaudy plumage.

IN ALL HIS PRIDE

The peacock is the proverbial personification of pride, and indeed he has good reason to be proud, for the old proverb that "fine feathers make fine birds" is nowhere truer than in his case. As an embodiment of beauty and grace, there are few things that equal a peacock "in his pride," as the heralds describe him when they emblazon him on a coat-of-arms with his tail outspread.

LAKE MAGGIORE

A short journey by rail brings one to the edge of Lake Maggiore, which though limited to a certain extent in its beauty area, is unsurpassed in parts. The northern portion is by far the best, the beauty culminating in the neighborhood of Stresa. It was called by the Romans Lacus Verbanus, and is, as its name implies, the largest in the vicinity, being forty miles long and in places six to seven miles wide. It is a beautiful and picturesque ride down the lake, passing many summer homes and villas, with their lovely surroundings, nestling in peace at the foot of the many mountain peaks, and one may hear the distant tingle of bells from the herds quietly grazing in some far-off pasture.

One of the first places of interest to the traveler is Laveno, situated on the west coast of the lake and near the mountain of Tasso del Ferro. From the summit the white marble Cathedral of Milan, over 40 miles away, can be seen distinctly, with its many turrets and pinnacles.

Across the lake lies Pallanza, a busy little town at the foot of Mt. Rosso, which is more of a winter resort, owing to its receiving the warm southern winds.

BORROMEAN ISLES

Proceeding southward on our journey, we encounter the interesting Borromean Isles, which are four in number—Isola S. Giovanni, Isola Bella, Isola Madre, and Isola Superiore—the first three belonging to the noble family of Borromeo.

Isola Madre is a charming place, built with seven terraces, having gardens containing rich and rare tropical fruit-trees and flowers growing in profusion. It is well kept and a fine place to spend a pleasant hour or so, enjoying such a collection of nature's growth.

ISOLA BELLA

This island is thoroughly artificial and rather more curious than beautiful, with terraces, formal gardens, and groves, which contrast with the wildness and simplicity of some of the islands of this group (see pages 952 and 953).

It has an interesting history, for previous to 1670 it was nothing but a barren rock, without vegetation and subjected to the washing of the waves, which had dashed against it for centuries, almost severing it in twain. At that time Count Borromeo started the great task of making it into the fairy place it is today by quarrying the rock from places and filling it in others, building the arches, terraces, and buttresses.

Thousands of boat-loads of rich earth were brought from the mainland and distributed over the rocks in sufficient depth to insure vegetation its proper nourishment. This being accomplished, the chateau was built and finished in a lavish manner, many of the original articles still remaining intact, such as furniture, draperies, curious and personal effects of the various residents. Among other things of historic interest here is the bed in which Napoleon slept the night before the battle of Marengo.

There are a number of terraces, one built upon another, spacious walks encircling the island and shaded by fine old trees of every shape and kind.

Amid these surroundings strut a flock of pure white peacocks, which seem ever ready to welcome the visitors and display their beautiful snow-white plumage (see pictures, pages 954 and 955).

There is a most exquisite view of the distant bold mountain peaks of some of the higher Alps, including Mt. Rosa, the Strahlhorn, and the twin white forked peaks of the Simplon.

On Isola Superiore is a charming little fishing village, very compact and contrasting with the clean and neat island just described.

The white town of Stresa lies on the edge of the lake, while on the mountain slopes back of the town are verdant pastures for the grazing of the herds. A very fine view is to be had from here of the Borromean Isles, lying but a short distance to the northward.

Mt. Mottarone, which is near here, rivals the Rigi of Switzerland in the fine view to be had from its summit. The plains of Lombardy and Piedmont spread out in panorama, while their rivers appear as ribbons of silver interlacing them.

From Stresa we again take the train on our journey to Milan, thus completing the circuit of the lakes.

VOL. XXIV, NO. 9 WASHINGTON SEPTEMBER, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

THE RESURRECTION OF ANCIENT EGYPT

By James Baikie

Author of "Sea Kings of Crete," in the National Geographic Magazine, January, 1912

IF THE Elizabethan age was the period of the discovery of new worlds, a period bright with all the romance and fascination of man's adventure into the unknown, our own age may be defined as the period of the resurrection of ancient worlds, and the romance of the explorations which have given back to us the buried civilizations of Assyria, Babylonia, Egypt, Crete, and Asia Minor has in its own way been almost as thrilling as that which marked the discoveries of Columbus, Cortez, and Pizarro. Ancient and mighty empires, which lived for us only in the dim traditions and distorted pictures of classical historians, have risen out of the dust of the past.

They have begun to take shape and solidity before our eyes; their palaces, their temples, and their tombs have yielded us unquestionable and vivid illustration of the height of culture which they had reached in almost incredibly ancient days. It is scarcely an exaggeration to say that we know as much of the life and the customs of the leading peoples of four millenniums ago as we do of those of the European nations of the Middle Ages.

In the wonderful record of exploration which has restored to us the civilization of the great pre-classical nations, there is no more remarkable chapter than that which tells of the resurrection of ancient Egypt. It contains perhaps no incident so thrilling as Layard's discovery of the buried palaces of Assyria, or Evans's unearthing the legendary Labyrinth of Minos in Crete, for the mightiest relics of the power of ancient Egypt—the Pyramids, the Colossi, the temples of Karnak and Luxor—have never ceased through all the centuries to bear their evidence to the greatness of the men who reared them. But it is only within the lifetime of the present generation that exploration of the wonders of which these were the surface indications has become systematic, and that we have begun to pass from the stage of mere wonder to that of scientific research and coördination of the facts disclosed by excavation.

The science of Egyptology, which is slowly and patiently reconstructing for us the ordered history of the 3,000 years before Christ, and enabling us to see the types of men, the manner of life, the forms of government, the religious customs and beliefs of period after period, from the very dawn of Egyptian nationality, is specifically a growth of our own time.

ROUGH AND READY METHODS OF EARLY EXPLORERS

The older period of Egyptian exploration may be said to have closed with Mariette. Despite his abundant energy,

his wonderful instinct for a promising site, and the astonishing amount of interesting material which he accumulated during his explorations, this devoted explorer had not the genius of patience and orderliness, the sense of relation, and the conviction of the importance of all facts and things, however small, which characterize the modern scientific spirit. His undeniably important work was done in a big, broad, and also somewhat loose and wasteful fashion; and while we can see and acknowledge how much he discovered and preserved, we can only conjecture how much was overlaid and lost in the process.

The meshes of his wide-flung net were too large to deal with the smaller spoil of the archeologist, and he could not understand that from the point of view of knowledge to be gained from it a potsherd may be more important than a pyramid. Modern investigation no longer proceeds on his somewhat slapdash and wasteful methods. It holds no site to have been really explored till every scrap of pottery which it yields has been collected, numbered, and studied, and the very earth and sand have been painfully riddled through a sieve.

The result of all this laborious investigation is that instead of being confronted with a confused mass of facts, wonderful enough individually, but unrelated and perplexing, we are gradually being presented with a coherent picture of the history and the life of the various periods of the ancient Egyptian nationality from its earliest days down to historic times.

Modern exploration has not, of course, followed and could not follow a strictly chronological order in its researches. Explorers had to take and to interpret whatever a site yielded to them, whether it belonged to the first dynasty or the thirtieth, or to both. As a matter of fact, perhaps the greatest impulse was given, as certainly the greatest popular interest was excited, by a discovery whose fruits belong largely to what must be considered a comparatively late period of Egyptian history—the discovery of the cache of royal mummies at Deir-el-Bahari.

But our purpose will best be served by disregarding the order of time in which the discoveries have been made and tracing the growth of modern knowledge concerning the various historical periods, beginning with the earliest dynasties.

THE HISTORY OF MANETHO VERIFIED

We owe the framework into which we try to fit the facts of Egyptian history to the ancient historian, Manetho, scattered fragments of whose history of Egypt, dating from the reign of Ptolemy Philadelphus, in the third century B. C., have come down to us in the works of various ancient authors. He recognized thirty dynasties of Egyptian monarchs, and he has left lists of the names of the kings in each of these dynasties, together with occasional notes upon matters of historical interest in particular reigns.

It has long been known that, whatever problems and difficulties might be connected with Manetho's later king lists (and these difficulties are neither few nor small), we at least began to get into touch with actual historic realities at the point where his fourth dynasty commences; for it was recognized that in his Souphis, Saphis, and Mencheres we had corruptions of the names of Khufu, Khafra, and Menkaura, the builders of the three largest pyramids (see pages 960, 961, 964, 966, and 967).

Beyond that point, however, history seemed to vanish into the mists. The kings of the earlier dynasties, Menes and the rest of them, were shadowy, unreal figures, who perhaps never existed save in the imagination of the historian—mere creatures of legend, such as we find at the beginning of all national histories. But if there has been one thing which modern investigation has taught us clearly, it is that the legends which describe the beginnings of national history are never mere figments of the imagination.

The generation which has seen the Labyrinth of Minos and the dancing-ground of Ariadne rise from the earth at Knossos may be held to have learned

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THE FIRST ATTEMPT AT A PYRAMID: SAQQARA, EGYPT

According to the Greek historian, Manetho, this was the first stone building in the world. It was built by the architect Imhotep as a burial place for his master Zeser or Neterkhet, a king of the third dynasty. On the east and west sides the base measures 396 feet, the other two sides being 352 feet, while the height is about 195 feet. The chambers and passages within this step-pyramid are lined with blue and green glazed tiles, which bear the king's name and titles. This building represents the transition between the so-called "Mastaba" tombs in which the earlier kings were buried and the true pyramid of later date.

that lesson once for all. The people of the world's childhood were less imaginative and more truthful than we had supposed, and a legend on the surface of history means a historical fact buried somewhere beneath if only you can unearth it.

THE SEMI-MYTHICAL KINGS PROVE TO BE REAL

So it has proved to be with these shadowy kings of the earliest Egyptian dynasties. Manetho's fables about one of them being slain by a hippopotamus, while in the reign of another the Nile flowed with honey, may be mere fables; but the men were there, and their royalty was a very real and tangible thing. Since the early nineties investigations have been carried out by de Morgan at Naqada and elsewhere, and by Amélineau, and especially by Petrie at Abydos, which have resulted in the discovery of the tombs of many of these ancient roy-

Photo by A. W. Cutler

AN EVENING VIEW OF THE PYRAMIDS, AS SEEN FROM THE VILLAGE OF KAFR

The little Arab village of Kafr is the nearest inhabited point to the pyramids of Gizeh, which stand on the yellow-brown sands of the vast Libyan desert, which stretches away to the west until it merges into the Sahara. These wonderful monuments are the property of a tribe of desert Arabs, who levy a toll (now fixed by the government) on all who come to view them. They lie on the west bank of the Nile about 5 miles south-west of Cairo, with which they are connected by a tramway.

Photo by A. W. Cutler

PRAYER ON THE GREAT DESERT, UNDER THE SHADOW OF THE THREE PYRAMIDS OF GIZEH

These most famous of all the pyramids of Egypt were built as tombs for three kings of the fourth dynasty. At the extreme right of the picture stands the Great Pyramid, the tomb of Khufu or Cheops; next to it, in the center, is the Second Pyramid, or that of Khafra; while to the left is the Third or smallest pyramid, that of Menkaura. The height of the Second Pyramid is only a few feet less than that of Khufu, but it stands on a platform of rock, which gives it the appearance of being higher than it really is. Menkaura's pyramid is less than half the height of the others and is inferior both in dimensions and workmanship. The sarcophagus of the king was discovered in it in 1838, but was unfortunately lost at sea while being shipped to England.

Photo by J. P. Altberger

THE SPHINX

Near the Second Pyramid stands the Sphinx, the most famous and mysterious of all Egyptian sculptures. This huge human-headed lion lies half buried in the sand looking due east across the Nile. The body is 150 feet long, the paws are 50 feet, and from the base to the top of the head the height is 70 feet. No one knows when this royal portrait was erected, but it seems probable that it was at some period during the fourth dynasty. Between its paws is a tablet relating how Tahutmes IV, a king of the 18th dynasty, found the statue buried in the sand and how, in a response to a vision, he excavated it. Rameses II, the Ptolemies, and the Romans restored broken parts, and at the last clearing of the sand portions of the beard were found between the paws. The name of the Sphinx in Egyptian was Hu.

alties and the accumulation of a most interesting mass of information with regard to the civilization of their time, the organization of their courts, and the attainments of the race over which they ruled.

The tombs of these ancient monarchs were not such as could be erected by a race undeveloped or just emerging from barbarism; they could only have been the product of a people comparatively far advanced in culture, and their contents revealed evidence not only of an astonishing proficiency in the arts of peace, but also of an elaborate and complex social organization, such as we should scarcely have deemed possible at so early a date.

The kings of the earliest dynasties reared no pyramids. Their tombs were great structures mainly underground—that of Aha (who is possibly Mena, the first king of Egypt) at Naqada measures 175 feet by 88 and contains 21 chambers—built sometimes of brick, with a lining of wood, and sometimes floored with stone, as in the case of the tomb of King Den at Abydos, whose granite floor furnishes the earliest known example of the use of stone in building.

These huge homes of the dead were filled with all sorts of objects which might be necessary or useful for the deceased king in the underworld.

THE KING'S SLAVES WERE SLAIN AT HIS GRAVE TO ACCOMPANY AND SERVE HIM IN THE AFTER-LIFE

Around him were buried his slaves, who were doubtless slain at his grave that they might accompany and serve him in the after-life. The chambers of his tomb were stored with stacks of great vases of wine and corn, with pottery dishes, splendid copper bowls, carved ivory boxes, golden buttons, palettes for grinding face paint, chairs and couches of elaborate design and decoration, ivory and pottery figurines, and plaques bearing records of the king's valor in war or his piety in the founding of temples.

Here and there in this wreckage of immemorial splendors a little touch helps us to realize that these dim historic figures were real men, who loved and sorrowed as men do still. Close to Mena's second tomb at Abydos lies that of his daughter—Bener-ab, "Sweetheart," as he called her—to suggest how love and death went side by side then as now.

The furniture of the tombs reveals an amazing proficiency in the arts and crafts. Ebony chests inlaid with ivory, stools with ivory feet carved in the shape of bull's legs, vessels cut and ground to translucent thinness, not only out of soft alabaster, but out of an iron-hard stone like diorite, finely wrought copper ewers, all tell us that the Egyptian of the earliest dynastic period was no rude barbarian, but a highly civilized craftsman. Perhaps the daintiest and most convincing evidence of his skill is given by the bracelets which were found encircling the skeleton arm of the queen of King Zer, of the first dynasty, which, alike for the grace of their design and for the skill with which the gold is wrought and soldered, are admirable.

But these tombs have not only yielded evidence of the skill of the Egyptian workman; they have taught us that even at this incredibly early date the nation had a complete method of expressing its thought and had reached a thoroughness of organization which we should not have imagined possible. At an early period in the first dynasty hieroglyphic writing has begun to make its appearance; by the middle of the period it is completely developed; before the end of the dynasty it has already become so familiar that the symbols are carelessly engraved. On the very lowest date which may be assigned to the dynasty this fact gives the Egyptian an astounding start of all other nations in the art of writing.

The inscriptions tell us of a court fully organized, with a complete bureaucracy. Mena has his chamberlain. His successor, Zer, tells us of a "commander of the inundation," a proof of the early date at which the Nile flood was utilized and regulated for the benefit of the land. In subsequent reigns of the same dynasty we meet with a "commander of the elders," a "keeper of the wine" (the ear-

Photo from Alexander Aaronsohn

THE SECOND PYRAMID

The Second Pyramid, the tomb of Khafra, is not of such perfect workmanship as the Great Pyramid, though it is in some respects better preserved. All three pyramids were originally sheathed from base to summit in magnificent casings of limestone, which were so skilfully laid and finished that it was almost impossible to discern the joints. These casings remained intact until the 13th century of our era, when the Moslem builders of Cairo despoiled the pyramids to obtain material for the mosques and palaces of their city. All that now remains is at the apex of the Second Pyramid, as can be seen in the picture. This masonry cap extends for 150 feet and furnishes an excellent scale by which some idea of the

liest ancestor of the "Pharaoh's chief butler," with whom we have so long been familiar), a "leader of the peers," head of the most ancient of earthly aristocracies, and a "master of ceremonies," while the titles of "royal seal bearer," "scribe of accounts of provisions," "keeper of the king's vineyards," and "royal architect" show us with what minuteness the business affairs of the court were regulated.

THE CIVILIZATION OF EGYPT A SLOW GROWTH

In a sense these revelations of the earliest Egyptian dynastic civilization have done much to simplify the enigma presented by Egyptian history. The civilization of the Nile Valley no longer challenges us with the Great Pyramid as the first essay of its development or seems to spring full-grown like Athene from the head of Zeus.

We can see that civilization in Egypt followed the natural course of development by which it has grown to maturity in all other lands. It was the gradual growth of many centuries of patient effort on the part of pioneers whose greatness the later Egyptians reverenced by a true instinct, though perhaps their actual knowledge of them was even scantier than that which the excavations of Abydos have given to us.

In another sense, however, the wonder has only been increased by the disclosure of the fact that the rise and development of this race are so much more ancient than was believed a few years ago to be the case. The emergence from the mists of the past of this ancient world, with its great kings, its ordered courts, and its highly organized government, is surely one of the most dramatic surprises which the progress of scientific investigation has presented to the modern mind.

AT WHAT DATE DOES HISTORY DAWN IN EGYPT?

To what date are we to assign these earliest beginnings of monarchy? Here, unfortunately, we become at once involved in a controversy in which a century is but "as yesterday when it is past, and as a watch in the night." Egyptology is at present hopelessly divided against itself over the question of all dates prior to 1580 B. C. Into the details of the controversy it is useless to dream of entering.

Between the dating of the Berlin school, represented by Mayer, Erman, and Breasted of Chicago, and the longer system, whose chief advocate is Flinders Petrie, there is a systematic difference of many centuries. Petrie places the beginnings of the first dynasty at 5510 B. C., while the Berlin school brings them down to 3400 B. C.

The difference is staggering and no compromise upon a middle term is possible; only the emergence of fresh facts can settle the question. At present the balance of opinion inclines toward the shorter system of dates; yet it must be remembered that new discoveries may at any moment make it untenable and force us back upon Professor Petrie's ampler scheme. In any case, and upon the most conservative estimate, we must accept the fact that by the middle of the fourth millennium B. C. society in Egypt was already in a state of high organization and culture.

Thus the discoveries of the last few years, and especially those of Professor Petrie at Abydos, have put our ideas of these earliest dynasties of Egypt upon a solid basis of material fact. The interpretation of the results and the identification of the various kings whose relics have been discovered are slow and laborious processes, involving much controversy; but the uncertainty of many of the details does not affect the outstanding historical fact. The kings existed and ruled over a state which, far from being barbarous, was already far advanced in the scale of civilization.

AN HISTORIAN'S REPUTATION RESTORED BY A MUMMY

That these early centuries witnessed a steady growth in knowledge and power on the part of the rulers of the Nile Valley is evidenced by the explorations which have been made with regard to the kings of the dynasties immediately

A NEAR VIEW OF THE GREAT PYRAMID

No building, ancient or modern, has ever commanded so much interest and attention as this vast tomb of Khufu. Today it measures about 755 feet at the base and its height is 451 feet. Before its outer limestone casing was removed the sides were 20 feet longer and the top 30 feet higher. It has been calculated that the weight of its stones amounts to some 6 million tons and that it contains enough material to build a town large enough to house 120,000 people. The Greek historian, Herodotus, states that 100,000 men were employed for over 20 years in its erection, working in relays of three months at a time. Near the Second Pyramid the remains of barracks, affording accommodation for 4,000 skilled masons, can still be traced. The stone was cut from quarries on the opposite side of the Nile and floated across at the time of the annual inundation.

ASCENDING THE GREAT PYRAMID

"Accuracy equal to optician's work, but on a scale of acres instead of inches, is scarcely what one expects in buildings reared nearly 5,000 years ago, but the huge blocks of the Great Pyramid, 2,300,000 of them, weighing on an average of 2½ tons apiece, while some run to 40 and 50 tons, are squared, fitted, and leveled with an accuracy which puts to shame our best modern work, and compels our respect not only for the strength, but for the skill, of these mighty builders before the Lord" (see page 973).

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LOOKING DOWN THE MAIN PASSAGE LEADING TO KHUFU'S SEPULCHER WITHIN THE GREAT PYRAMID

Right in the heart of the Great Pyramid was the sepulchral chamber of Khufu (Cheops), approached by this gloomy passage. It is 175 feet long and 28 feet high, but only 7 feet in width. The four natives with candles give some idea of its length and gloom, the last candle showing as a mere spot of light glimmering in the distance. Notice the perfection with which the stones join each other, especially at the right of the picture. Some of these blocks, weighing many tons, are set together with a contact of one five-hundreths of an inch, a refinement of the mason's art which is seldom or never equaled in our own day.

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BROKEN BY ROBBERS: KHUFU'S SARCOPHAGUS, IN THE SEPULCHER CHAMBER OF THE GREAT PYRAMID, EGYPT

Unlike the rest of the pyramid, which is faced with limestone, the burial chamber of Khufu is constructed of great blocks of weathered granite cut from the rocks at the first cataract of the Nile. Over it are five small chambers, one above the other, designed to render the roof of the burial chamber safe by relieving it of some of the weight of the vast mass, which would otherwise press dangerously upon it. After the body of Khufu was laid in his great sarcophagus, the entrance to this chamber was sealed and workmen dropped into their places great blocks of granite, filling the end of the passage for 17 feet; then a cunningly devised block was filled into the entrance which hid all appearances of an opening. Yet, despite all these precautions, the rest of the great King was disturbed by Arab tomb robbers, who forced their way in, plundered the sacred body, and carried off the jewels and the rich furniture which always surrounded the royal dead.

Photo by A. W. Cutler

ENTRANCE TO THE TOMBS OF THE SACRED BULLS AT SAQQARA

The tunneling goes far under the desert. There are 24 huge marble sarcophagi, each dedicated to one of the sacred bulls

succeeding. In 1900 Garstang excavated at Bet-Khallaf, near Abydos, the tombs of two of the earliest kings of the third dynasty—Zeser and Sa-nekht. The tomb of Zeser is a huge mass of brickwork 300 feet in length by 150 in breadth and 40 in height. The actual tomb chambers are hewn in the rock 20 feet below the ground level and 60 feet below that of the summit of the tomb.

Unfortunately, like so many of the royal tombs of Egypt, the great sepulcher had been rifled in ancient days; but sufficient relics survived, in the shape of clay jar-sealings, alabaster vases and bowls, and other articles, to identify the owner of the tomb. Sa-nekht's tomb was very similar to Zeser's, and the skeleton of the dead king, which was found in it, seems to suggest that poor Manetho, whose credit as an accurate historian has often suffered at the hands of incredulous moderns, was not always so inaccurate as he has been accused of being.

Among the marvels which he relates of the early kings there is a statement that a certain king named Sesokhris measured 5 cubits in height. The skeleton of Sa-nekht proves its owner to have been a giant 7 feet high, and it is tempting to identify him with Manetho's five-cubit Sesokhris, especially as names were never Manetho's strong point.

THE BUILDERS OF THE PYRAMIDS

Like many of these ancient kings, Zeser was not content with a single tomb. He had another at Saqqara, near Memphis—well known to Egyptian tourists as the Step Pyramid—the most imposing structure which has survived from such an early date. It measures between 300 and 400 feet in length on the sides and is 195 feet in height, while the chambers of the interior were lined with fine blue and green glazed tiles (see page 959).

A king who could rear such a structure had evidently at command the resources of a very well organized state and capable architects. Zeser's architect and vizier, Imhotep, became in later days the typical wise man of Egypt, "whose counsel was as though one inquired at the oracle of God." He was the patron saint of the Egyptian scribe, who always poured a libation to him from his water-jar before beginning to write. Two

Photo by A. W. Cutler

GOING TO BED IN A CUP

These curious cup-like structures, made of sun-baked mud, are seen in Egyptian villages. Families sleep in them at night during the great heat of the summer to escape the snakes and scorpions which abound.

thousand five hundred years after his death he had been transformed into a god of medicine, whom the Greeks knew as Imouthis and whom they identified with their own Asklepios.

The head of the giant Sa-nekht, carved in the rock of the Wady Maghareh at Sinai, presents strongly marked Ethiopian characteristics, and Petrie infers that the third dynasty marks an infusion of Ethiopian blood into the ruling race, whether by conquest or marriage, the mixture of race giving rise to the remarkable development of energy which characterized the succeeding dynasty.

That development, of course, is sig-

THE NILE FROM ITS MOUTH TO THE FIRST CATARACT

nalized by the achievements of the great fourth dynasty—the race of the pyramid builders. Modern investigation has added nothing very striking or novel to our knowledge of the mighty men who reared the greatest masses of stone ever heaped upon earth by the hand of man; but Petrie's course of systematic triangulation and measurement, carried out in 1881-1882, has only added to the wonder and admiration which the mere aspect of the pyramids compel.

Accuracy "equal to optician's work, but on a scale of acres instead of inches," is scarcely what one expects in buildings reared nearly 5,000 years ago. But the huge blocks of the Great Pyramid, 2,300,000 of them, weighing on an average 2½ tons apiece, while some run to 40 and 50 tons, are squared, fitted, and leveled with an accuracy which puts to shame our best modern work and compels our respect not only for the strength, but for the skill of these mighty builders before the Lord (see pages 966 and 967).

No amount of mere brute strength could have accomplished such a feat. There must have been controlling intellect of the very highest type at work, supplemented by a determined and despotic will capable of bending the whole resources of the nation to a single task. That the task may have had as its sole object the glorifying of the egotism of a single individual need not diminish our wonder at the patience and skill with which it was carried out.

The most interesting result of modern investigation on this period of Egyptian history has, however, been one not of exploration, but of historical and literary work. An Egyptian papyrus of the twelfth dynasty, brought home by an English traveler, was transferred by its owner, Miss Westcar, to the famous German Egyptologist, Lepsius, from whose property it was purchased by the Berlin Museum. The Westcar papyrus has afforded us the earliest series of wonder tales known to exist in the world; but it has also yielded the hint of a sudden revolution in Egyptian history, and of the usurpation of the throne at the close of the great period of the pyramid builders by a line of priestly kings.

THE ARABIAN NIGHTS OF ANCIENT EGYPT

The story pictures to us King Khufu, the builder of the Great Pyramid, listening to his sons as they tell him tales of the great magicians of former days.

One of them, Prince Hordadef, tells him of a magician of the present time who can do deeds as great as those of any wonder-worker of the past. He is dispatched to summon the wizard, and, after the latter has given evidence of his power, he prophesies to the king of the approaching birth of three sons of a priest of the sun-god Ra, who shall be really children of the god and shall reign over the whole land of Egypt. The king is naturally troubled at such a prophecy, and the magician consoles him by telling him that the change of dynasty shall not come in his day. "Thy son, his son, and then one of these." The story then goes on to tell of the birth of these wonderful children and of the divine honors which attend them. Obviously we have here an attempt to give a popular account of the rise of a new race of kings devoted to the worship of Ra, the sun-god.

THE NEXT (FIFTH) DYNASTY WERE SUN-WORSHIPPERS

The complement of the narrative has been furnished by the excavations of the German explorers at Abusir, which have yielded unmistakable evidence of the fact that the kings of the fourth dynasty were succeeded by a dynasty of sun-worshipers. Von Bissing, Schaefer, Thiersch, Rubensohn, and Borchardt have there laid bare the great sun temple of Neuser-ra, sixth king of the fifth dynasty.

Its whole plan and conception are unlike those of the normal Egyptian temple. It consists of a large, open court, with chambers surrounding it; in the center of the court stands a huge altar of fine alabaster, on which slain oxen were offered to the sun; west of the altar rises a large mound, on which was placed a truncated obelisk — the emblem of the solar deity. There was no holy of holies, the emblem of the god standing open to the sky to catch the sun's rays.

The interior walls of the court were covered with reliefs representing the production of life, scenes from the river,

TOMBS OF THE KINGS: THEBES

"In 1881 M. (now Sir Gaston) Maspero was led to the mouth of a disused tomb at the foot of the cliffs of Deir-el-Bahari, where, in the bowels of the earth, was discovered the most wonderful collection of the mummies of the great kings of the most glittering period of Egyptian history. . . . The mummies were found, by hastily scrawled inscriptions on their bandages, to have been gathered in their hiding place by the priests of the 21st and 22d dynasties. . . . The panic-stricken priests shifted the bodies of their dead masters from tomb to tomb . . . until at last, about 940 B. C., they found in the pit of Deir-el-Bahari a resting place sufficiently obscure to baffle their relentless enemies" (see pages 986 and 989).

swamps, fields, and incidents in the state worship, while on the outer walls were pictures of the warlike achievements of the Pharaoh. Beyond the court, on the south side, lay a great model of the bark of the sun-god, 96 feet long, built of brick. Apparently each king of the dynasty erected such a temple, as a complete series can be traced, extending to the reign of Assa, the eighth king.

Photo from Egypt Exploration Fund

USHABTIS, OR ANSWERERS

It was the custom with the earlier dynasties when a king died to slay all the members of his harem and many slaves, that they might be buried with him. Later, instead of human sacrifices, these little figures, or mimic servants, were substituted (see pages 981 and 983).

A RACE OF EXPLORERS AND ADVENTUROUS TRADERS

The kings of this line are also the first to begin systematic exploration of the surrounding countries. Already, a century and a half before, Seneferu, the last king of the third dynasty, had sent a fleet to Syria; but Sahura, the second king of the priestly line, records a voyage to Punt, or Somaliland, which resulted in the bringing back of 80,000 measures of myrrh, 6,000 pounds weight of electrum (gold-silver alloy), and 2,000 staves of ebony wood. Assa, one of Sahura's successors, began that exploration of the Sudan which was continued so vigorously by the barons of Elephantine under the kings of the next dynasty. Altogether the priestly line of Heliopolis seems to have been more vigorous than priestly lines have usually been in the experience of other nations.

Perhaps the most remarkable result of investigation into the story of Egypt during the period covered by the next line of kings with whom the Old Kingdom, as it is named, closes is the proof afforded by the records that our old idea of Egypt, as a kind of China of ancient days, strictly isolated from other nations and jealous of all communication with them, must be entirely discarded. Far from being a secluded people, the Egyptians, even at this early period of their history, were active and enterprising merchants and explorers, pushing their trade far into the Sudan and maintaining regular communication by sea with Somaliland and Syria, and in all probability with the rising Minoan Empire of Crete.

THEY CAPTURE A PIGMY FOR THE KING

The story of the exploration of the Sudan and the Red Sea voyages we owe to the decipherment of the tomb inscriptions of the barons of Elephantine, who during the reigns of the sixth dynasty were the wardens of the Egyptian marches on the southern frontier—"Keepers of the Gate of the South"—as they called themselves. The most interesting of these inscriptions is that of

Herkhuf, who tells us of four expeditions which he made into the Sudan for gold-dust and ivory. On the last of these he got into touch, as Assa's caravan leader had done before him, with a tribe of that race of pigmies whom Stanley encountered in his search for Emin Pasha. Herkhuf succeeded in capturing one of the dwarfs and bringing him back to Egypt in safety.

His king, Pepy II, who at this time was a boy of 8 years, was highly delighted at the news of the capture of so choice a plaything, and wrote Herkhuf a gracious letter of thanks, full of minute instructions as to the care to be exercised over his precious charge. Herkhuf is to take great precautions lest the dwarf should fall into the river on his way down the Nile, and proper people are to watch behind the place where he sleeps, and to look into his bed ten times in the course of each night to see that all is well.

A QUAINT LETTER

"My Majesty," says the king, "wisheth to see this pigmy more than all tribute of Bata and Punt. And if thou comest to court having this pigmy with thee sound and whole, My Majesty will do for thee more than was done for the divine Chancellor Baurdeed in the times of King Assa, and conformably to the greatness of the desire of the heart of My Majesty to see this pigmy." Herkhuf was so proud of the king's letter that he caused it to be engraved, word for word, on the wall of his tomb at Elephantine as proof of the royal favor which he enjoyed.

It was in the small pyramids reared by the kings of this and the preceding dynasty, and mainly opened by Maspero in the early eighties, that there were found the so-called "Pyramid Texts," which have furnished us with most of our knowledge as to Egyptian religious beliefs in the earliest historical periods. These texts reveal an exceedingly primitive and almost savage set of religious conceptions, especially with regard to the life after death, which contrasts somewhat strangely with the high standard of material civilization which the period had attained.

A wild fancy pictures the deceased king ascending to heaven as a fierce huntsman who lassoes the stars and devours the gods. "Heaven rains, the stars fight, the Bowmen [one of the constellations] wander about when they have seen how he ascends and has a soul as a god who lives upon his fathers and feeds upon his mothers. . . . He devours men and lives upon the gods. . . . He it is who devours their magic and swallows their illuminated ones. The great ones among them are his morning meal, the middle ones are his evening meal, and the small ones his night meal. . . . Their magic is in his body; he swallows the understanding of every god."

Such ideas are not uncommon among cannibal tribes at the present time; but they coexist somewhat strangely with all the material splendors of the Old Kingdom and with the placid common sense and genial worldly wisdom which have already begun to find literary expression in the precepts of Ptah-hotep and Gemnikai.

THE DARK AGES OF EGYPTIAN HISTORY

With the decline of the Old Kingdom, at the close of the sixth dynasty, we enter upon one of the great dark periods of Egyptian history, whose darkness even the industry of modern exploration has done very little to lighten—probably because there is very little to discover about the period. It seems to have been a time when the elements of society in the land were in a state of solution, when the central power of the old Memphite monarchy no longer sufficed to control the feudal barons and princelets, and when the strife for dominion between the northern and southern sections of the community prevented that settling down to peaceful industry without which great work cannot be done.

The seventh, eighth, ninth, and tenth dynasties remain more or less shadowy to us, and we have only brief suggestions and glimpses of a civil strife which surged hither and thither in the narrow Nile Valley, as the princes of the north or the south alternately prevailed. The outcome of all the confusion was the shifting of the national center of gravity from Memphis to Thebes.

Photo from Rev. James Baikie

AN EGYPTIAN NOBLE AND HIS WIFE

This mural painting is in one of the rock-hewn tombs at Thebes, in the room where the deceased nobleman and his wife were supposed to live and eat the offering of food and drink supplied by their surviving relatives and friends. In the upper left-hand corner the whole family are depicted fowling and fishing. Like all the wall paintings in the Egyptian tombs, the colors are as fresh and vivid as if laid on yesterday, instead of more than 3,000 years ago.

Photo from Theodore M. Davis

QUEEN TYI

"Queen Tyi deserves to rank with Queen Hatshepsut as one of the two most remarkable women whom Egypt has produced. . . . In February, 1905, Mr. T. M. Davis . . . discovered the tomb of Yuaa and Thuaa, the father and mother of that Queen Tyi, whose influence played so great a part in Akhenaten's religious reformation. It had become almost an accepted belief that Tyi, whose influence was so pronouncedly pro-Mesopotamian, must have been herself of Mesopotamian origin. The tomb of Yuaa and Thuaa, however, reveal the fact that her parents were purely Egyptian, and . . . though probably not of royal rank, Queen Tyi's parents were at least people of considerable importance" (see pages 991 and 999).

Photos from Theodore M. Davis

MUMMIFIED MONKEYS AND DOG FOUND BY THEODORE M. DAVIS IN THE TOMB OF AMENHOTEP II

This king was very fond of monkeys, and when he died his pets were placed near him. The Egyptians seem to have mummified almost everything that had life; animals, birds, fishes, and insects were embalmed, and even the meat ceremonially offered to the dead was subjected to a similar process. Vast cemeteries of sacred animals and birds have been found, such as the great cat cemetery at Bubastis. In preserving the larger animals it was not the custom to embalm the entire body; thus, in the case of a cow, for example, it would be represented in the mummy by the head and a selection of the bones.

Photo from Theodore M. Davis

MORE MUMMIFIED MONKEYS FROM THE TOMB OF AMENHOTEP II

Other curious contents of the tombs were mummified ducks and chickens. These were preserved in wooden vessels, carved to represent the bird they contained. Another vessel contained delicious honey, which had been there for thousands of years.

This took place under the eleventh dynasty, which may be dated about 3502 B. C. or 2160 B. C., according to the scheme of chronology which is preferred. The twelfth dynasty indeed shifted the seat of government again back to the neighborhood of the old northern capital; still they were Theban princes, and it is with Thebes that the story of Egypt's greatness is bound up during all the rest of her history.

One of the remarkable finds of modern excavation has been that of the great funerary temple of King Mentuhotep Neb-hapet-ra, of the eleventh dynasty, which has conclusively shown us that this line of kings, hitherto almost as shadowy as its immediate predecessors, was indeed a great and powerful dynasty, the worthy forerunner of the Amenemhats and Senuserts of the following line, who brought in the Golden Age of the Middle Kingdom.

ONE OF THE MOST BEAUTIFUL TEMPLES EXCAVATED

At Deir-el-Bahari, near Thebes, there lies in a great bay of the limestone cliffs one of the most famous and beautiful of Egyptian temples, the terraced temple of Queen Hatshepsut, of the eighteenth dynasty. This wonderful building has always been known to exist and was completely excavated by Professor Naville in the nineties of last century. But on the completion of the work in 1898 there still remained a large tract to the south of Hatshepsut's temple covered with mounds of débris and awaiting exploration. Here, in 1903, Professor Naville resumed work for the Egyptian Exploration Fund. Excavation speedily revealed the existence of a temple of considerable importance, and the completion of the work laid bare the remains of a building fairly comparable in scale with the more famous temple beside it, anticipating to

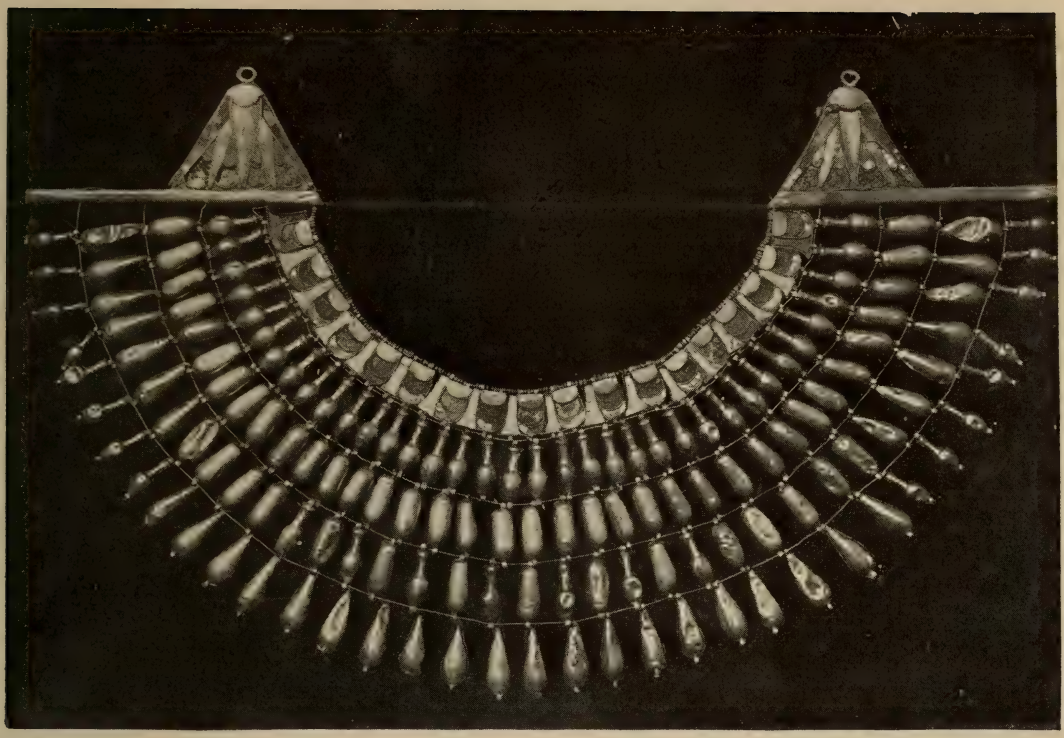

Photo from Theodore M. Davis

GOLD NECKLACE FOUND BY THEODORE M. DAVIS IN THE TOMB OF QUEEN TYI, JANUARY, 1907

"Egyptian jewelry, which has been familiar enough in specimens of the work of later periods, has often been open to the reproach of being somewhat heavy and overloaded in design, though admirable in execution; but the diadems of these royal ladies are of the most exquisite lightness and grace, combined with a skill in workmanship which would do honor to the most cunning craftsman of the present day" (see page 985).

some extent the peculiar architectural features of the latter, hitherto supposed to be unique, and excelling the eighteenth dynasty building in solidity of workmanship.

On an artificially squared rectangular platform of natural rock about 15 feet high was reared the pyramid of the king—a dummy, for his tomb has not been found. Around the pyramid was an ambulatory, whose roof was supported by octagonal pillars, while its outside walls were decorated with scenes of religious festivals, processions, husbandry, and so forth. To north and south were open courts, and the faces of the rock platform were riveted with large blocks of white limestone, some of them measuring 6 feet by 3 feet 6 inches, beautifully squared and laid. A sloping ramp led up to the platform of the temple, and was bordered by colonnades of 22 pillars, each inscribed with the king's names and titles.

The royal tomb, as already mentioned, was not found; but all around the central pyramid priestesses of the goddess Hathor were buried in small chamber-tombs. They were all members of the king's harem, and were called "royal favorites." From the fact that they were all buried at one time before the completion of the temple, it has been inferred that they were strangled at the king's death that their spirits might accompany him into the underworld. If so (the inference is not certain by any means), then this is the last instance of the occurrence of so savage a custom.

Already these royal favorites have buried with them the little figures, *ushabtis,* or "answerers," upon which

Photo from Rev. James Baikie

COLOSSI OF MEMNON ON THE PLAIN OF THEBES, LUXOR: EGYPT

Each colossus is 69 feet in height, hewn from a solid block of Assouan granite, weighing some 1,000 tons. The measurements of the colossi are startling: length of ear, 3½ feet; index finger, 3½ feet; breadth of foot across toes, 4½ feet; area of nail, middle finger, 35 square inches. After an earthquake in 27 B. C. the colossus on the right was damaged and began to emit a cry every morning shortly after sunrise, and the Greek residents of Egypt immediately identified the statue as Memnon, son of Eos, the Dawn. Many visitors were attracted by this phenomenon, including, in 130 A. D., the Emperor Hadrian, who, following the immemorial habit of tourists, scratched his name at the base. This strange cry was due to the rapid expansion of the stone caused by the heat of the morning sun.

the later Egyptians depended for service in the life beyond. Henceforward even royalty had to content itself with these mimic servants instead of the human *ushabtis* who had formerly been sacrificed to its importance (see page 975).

AN ARTIST'S AUTOBIOGRAPHY

Fortunately the name of the chief artist of Mentuhotep's reign has been preserved to us, with his description of his own qualifications. On a tombstone from Abydos, now in the Louvre, this great man, Mertisen by name, thus describes himself:

"I was an artist skilled in my art. I knew my art—how to represent the forms of going forth and returning, so that each limb might be in its proper place. I knew how the figure of a man should walk, and the carriage of a woman, the poising of the arm to bring the hippopotamus low, the going of the runner. I knew how to make amulets, which enable us to go without fire burning us and without the flood washing us away. No man could do this but I and the eldest son of my body. Him has the god decreed to excel in art, and I have seen the perfection of the work of his hands in every kind of rare stone, in gold and silver, in ivory and ebony."

In all probability it was this great and modest artist who planned Mentuhotep's temple, and, if so, we know the names of the builders of both the great temples at Deir-el-Bahari, for that of Hatshepsut was executed by Sen-mut, the queen's famous minister and architect.

The reasons which induced the Theban princes of the following dynasty to shift their court once more to the neighborhood of Memphis are unknown, though we may conjecture that the northern part of the kingdom, long accustomed to political supremacy, was proving restive under the transference of authority to the south. At all events the kings of the twelfth dynasty, who must rank among the greatest monarchs of the land, held their court at a fortified palace called Thet-taui, near the ancient Memphis, and much of the great work which they did for Egypt was accomplished in the neighborhood of the Fayum.

It was there that they were laid to rest in their brick pyramids, which have been explored, at various periods from 1888 onward, by Professor Petrie, M. de Morgan, and MM. Gautier and Jéquier. Had it not been for the evidence afforded by the results of these excavations, we should have been left without any adequate illustration of the greatness of the period, for the twelfth dynasty work has otherwise largely disappeared from the land.

The earliest excavation was that of the pyramid of Amenemhat III at Hawara. The pyramid itself yielded but little spoil. Its chief interest lay in the elaborate precautions which had been taken, by means of false passages and gigantic plug blocks of stone closing the true passages, to weary and defeat the efforts of tomb-robbers. Yet, in spite of all, it had been robbed in ancient days, not improbably with the connivance of the priests or officials in charge of the building, as only the outermost of the three great plug blocks closing the passages had ever been secured in its place.

But the amazing feature of the whole structure was the sepulchral chamber in which the royal sarcophagus had lain. No mere built chamber had been considered costly or safe enough for the remains of so great a monarch. A huge block of quartzite had been hollowed out into a chamber measuring inside 22 feet by 8, with walls 3 feet in thickness. A single block of the same stone formed a roof, the chamber itself weighing 110 tons and the roof 45.

The later Egyptians of the eighteenth and nineteenth dynasties handled, in the open, blocks much larger than this, the record being the seated colossus of Rameses II at Thebes, which weighed 1,000 tons (see page 1004), but the skill and resource involved in the accurate placing of such a mass of stone in its confined situation inspire a wholesome respect for the Egyptian workman of the twelfth dynasty.

The pyramid of Senusert II at Dashur was excavated in 1894-1896 by M. de Morgan, with the assistance of MM. Legrain and Jéquier. The chief find of importance lay outside the pyramid,

STATUE OF RAMESES II: MEMPHIS

Looking at this picture, it seems difficult to realize that these palm trees are growing in what were once the streets of the busy metropolis of ancient Egypt. As late as the Moslem conquest Memphis was still an important city, but after the twelfth century it began to serve as a quarry of building stone for the Arab cities of Fostat and Cairo, and so continued until all that is left is the solitary portrait statue of Rameses II, which once stood at the entrance of one of its temples. The statue is of granite brought from the quarries at the first cataract of the Nile, 600 miles away, and, excluding the crown, is 25 feet long

where some of the princesses of the royal house had been buried in a series of tombs opening out of a subterranean gallery. Here were found the wonderful jewels of the princesses Sit-hathor and Merit, which have given us a new conception of the skill and taste of the Egyptian goldsmith.

Egyptian jewelry, which has been familiar enough in specimens of the work of later periods, has often been open to the reproach of being somewhat heavy and overloaded in design, though admirable in execution; but the diadems of these royal ladies are of the most exquisite lightness and grace, combined with a skill in workmanship which would do honor to the most cunning craftsman of the present day. Worthy to stand beside them are the great pectorals, or breast ornaments, bearing the names of Senusert II, Senusert III, and Amenemhat III, with their brilliant designs in cloisonné, where beautiful colored stones, lapis-lazuli, carnelian, and green feldspar take the place of enamels (compare page 981).

THE RESURRECTION OF AN ANCIENT COUNTRY TOWN

Totally devoid of beauty, but more valuable to us than the most beautiful works of art, was the discovery made by Petrie in 1889-1890 of the remains of the town of Kahun, close to the pyramid of Senusert II at Illahun. It was known that Senusert had established a town for the builders of his pyramid, naming it "Ha-hetep-Senusert," "Senusert is content."

Petrie's excavations revealed the beginnings of the town wall close to the north side of the pyramid, and street by street the whole was cleared, until the practically unchanged plan of an Egyptian working-class town of the twelfth dynasty was revealed. The workmen of those days were poorly lodged. Their low mud-brick thatched houses were crowded into congested groups, separated by narrow alleys, while there were great ranges of barrack-like structures with a multitude of small chambers under one roof, open passages affording access to the various rooms.

Even in these congested quarters, however, evidences were not wanting that the life of the inhabitants was on a higher plane than we should have imagined from the character of their homes. Various papyri, included among which were two wills, the earliest known instances of such documents, a hymn of praise to Senusert III, and some pages of a medical treatise, showed that letters were not unknown. Toys of various kinds—whip-tops, model boats, dolls and draught-boards—suggested that child life has varied but little in its tastes through all the centuries.

HOW THE EGYPTIANS MADE FIRE

The question of how the Egyptians made fire was one that had often exercised archeologists. No representation of the process existed on the monuments, nor does the nation appear to have attached any religious significance to the origin of fire. The question was settled by the discovery at Kahun of a regular bow-drill for making fire, together with several sticks showing the burnt holes caused by fire-drilling.

Mixed with remains of twelfth dynasty Egyptian pottery were fragments of vessels which we now know to be of unmistakably Ægean fabric. Thus, more than eleven years before the treasures of Knossos were brought to light, evidence was revealed of intercourse between the Egypt of the Middle Kingdom and the great sister civilization of Crete.

ANOTHER PERIOD OF DARKNESS

The close of the twelfth dynasty, which seems to have been a period of great and solid prosperity, is followed by the second of the great dark gaps in Egyptian history. Of the dynasties from the thirteenth to the sixteenth and the great catastrophe known as the Hyksos domination, which falls within this period, little is known save from the fanciful and conflicting stories which have been preserved for us in Josephus and other more or less untrustworthy historical writers.

Nor can it be said that modern exploration has done much to lighten the

darkness. We know that upon a decadent Egypt, suffering perhaps from the reaction which seems so often to follow upon the rule of a race of strong and masterful monarchs, there descended a horde of invaders, probably of Semitic origin; that Egypt was conquered and lay under the dominion of these invaders for several generations, and that the yoke of the oppressor was not thrown off till the rise of the seventeenth dynasty, when the Theban princes asserted their power and, after a long war of independence, drove out the alien rulers. In spite of exploration and speculation, the Hyksos remain almost as much of a mystery as ever.

AN AGE OF SPLENDOR AND POWER

We come now, however, to that period of Egyptian history which has left us the most abundant and convincing evidences of its greatness and splendor. Quite probably the actual prosperity and power of the land under the empire was no greater than under the Middle Kingdom, and indeed the period of the Senuserts and Amenemhats comes more and more to be regarded as the true Golden Age of Egyptian history; but in the eighteenth dynasty Egypt begins to take definite rank as a world empire, and under the brilliant leadership of kings like Tahutmes III makes her one real appearance on the stage of history as a great military power, while the kings of the nineteenth dynasty, less successful in their warlike ventures, exhibit a splendor and lavishness in their domestic enterprises which are elsewhere unparalleled in the national history.

The mass of material coming down to us from this time is far greater than that which we possess from any earlier, and far more interesting than that from any later period, and it is in connection with eighteenth and nineteenth dynasty history and personalities that the romance of modern exploration has perhaps been most conspicuous.

The power and magnificence of the Egyptian monarchy in this period has for long, of course, been no novelty. Evidence of both was manifest and unmistakable in the great temple buildings at Karnak, Luxor, Abydos, the Rameseum, and elsewhere. What modern discovery has done is to fill in the outlines, to give color and movement to the picture, to reveal to us documentary evidence of the historical processes whose lines could be already traced, and to bring us, strangely enough, into contact with the actual remains of the men and women who guided the destinies of Egypt in these far-off days.

Nothing has more profoundly moved the imagination of the intelligent public than the fact that it has become possible to look upon the very faces and forms of men whose actions were familiar to us from our childhood in the Bible story—the Pharaoh who oppressed the Israelites and ordered their children to be cast into the river, and his successor, whose hard heart was humbled by the plagues of Egypt.

THE MUMMIES OF THE GREAT KINGS OF BIBLICAL TIMES DISCOVERED

From about 1871 it became evident, by the relics of certain kings which were coming by illicit channels upon the antiquity market, that tomb-robbers had obtained access to some hitherto unsuspected tombs. The authorities in Egypt took up the matter; methods of somewhat primitive justice were employed to extract the facts, and in 1881 M. (now Sir Gaston) Maspero was led to the mouth of a disused tomb at the foot of the cliffs of Deir-el-Bahari, where, in the bowels of the earth, was discovered a most wonderful collection of the mummies of the great kings of this most glittering period of Egyptian history (see page 974).

Tahutmes III, the great soldier of Egypt, was there, proving, like so many other famous captains, to have been a man of somewhat small stature and insignificant appearance. Rameses II, the Great Oppressor of Hebrew story and the most grandiose figure of Egyptian history, and, most stately and kingly of all, Sety I, the father of Rameses, whose wonderfully preserved features, clear-cut and aristocratic, convey a remarkable impression of royal dignity; these, and many other figures of less significance,

Photo by A. W. Cutler

A BISHAREEN BOY AND GIRL AT ASSOUAN

The Bishareens are the aborigines of Nubia and an encampment of them may be seen on the outskirts of Assouan, near an old Arab cemetery. This photograph was taken at the threshold of one of the burial grounds.

THE GATEWAY OF PTOLEMY EUERGETES AT KARNAK

This monument, erected by a member of the last royal line in Egypt about 230 B. C., is the best preserved structure at Karnak. It stands at the entrance to the temple of the god Khons, the Son of Amen, and his consort Mut, who were the three gods chiefly worshiped at Thebes. On the other side of the portal is another magnificent avenue of sphinxes similar to that shown on page 990. Nothing now remains of the temple of Khons, which was built by Rameses II in the twentieth dynasty, except a few stones sufficient to show the ground plan.

royal and princely, proved to have been all huddled together in this obscure pit.

The discovery of this astonishing cache of ancient royalties, and especially the fact that some of the bodies discovered were those of men who must have been in touch with scriptural heroes and events, gave a great impulse to popular interest in Egyptology. The mummies were found, by hastily scrawled inscriptions on their bandages, to have been gathered in their hiding-place by the priests of the twenty-first and twenty-second dynasties. At that time the decaying authority of the later Pharaohs had proved insufficient to protect the royal tombs from the raids of the tomb-robbers, who have always found a profitable business in Egypt.

In vain the panic-stricken priests shifted the bodies of their dead masters from tomb to tomb, recording each reburial as it was made. Each successive hiding-place was violated, until at last, about 940 B. C., they found in the pit of Deir-el-Bahari a resting-place sufficiently obscure to baffle their relentless enemies. There this grim company of ancient dignities slept undisturbed for nearly 3,000 years, till modern science, as remorseless as ancient knavery, dragged them from their rest to become a gazing-stock in modern museums.

A KING WHO RESTED UNDISTURBED

Since Maspero's great find, there has been no discovery of royal mummies on anything like so extensive a scale; but now and again research in the Valley of the Kings at Thebes has added another royalty or two to the stock. The most important of the later discoveries have been that of the mummy of Amenhotep II, the only Egyptian king whose body has so far been found resting within its own tomb; that of Merenptah, supposed to have been the Pharaoh of the Exodus, the actual opponent of Moses, and that of the bones of Akhenaten, the heretic king, which were found in the grave of his mother, Queen Tyi, by the American explorer, Mr. Theodore M. Davis, whose good fortune in this form of exploration has been phenomenal.

The tomb of Amenhotep II was discovered in 1898 by M. Grèbaut. The great king was found lying in state in his rock-hewn sepulcher with its gold-starred blue-painted roof, his bow, of which he boasted that none save himself could bend it, lying beside him. The Egyptian authorities have allowed him to rest in the grave where his mourning subjects laid him; but his tomb has been made the scene of an exhibition whose taste is perhaps rather more than doubtful.

"The royal body," says Mr. H. R. Hall, "now lies there for all to see. The tomb is lighted by electricity, as are all the principal tombs of the kings. At the head of the sarcophagus is a single lamp, and when the party of visitors is collected in silence around the place of death, all the lights are turned out, and then the single light is switched on, showing the royal head illuminated against the surrounding blackness. The effect is indescribably weird and impressive." Some might feel tempted to say indescribably vulgar; and one wonders what Amenhotep's own opinion of it all might have been.

THE PHAROAH OF THE EXODUS

Amenhotep's tomb contained also another mummy, which occupied a coffin bearing the name of Set-nekht. When the coffin was opened the mummy was found, by means of a scribe's inscription on one of the bandages, to be really that of the Pharaoh who is above all others most interesting to students of biblical history—Merenptah, the Pharaoh of the Exodus. Hitherto the absence of his body from its sarcophagus in the royal tomb in the Valley of the Kings had been accounted for by careless readers of the Bible as quite natural, seeing that the Pharaoh of the Exodus was drowned in the Red Sea. The Exodus narrative, of course, makes no such statement, and Merenptah's absence from his own tomb is now accounted for. He had simply been moved to Amenhotep's tomb for greater security against the attempts of tomb-robbers.

On July 8, 1907, Merenptah's mummy was unwrapped by Prof. Elliot Smith in

Photo by A. W. Cutler

THE FAMOUS AVENUE OF SPHINXES, LEADING TO THE GREAT TEMPLE OF AMEN-RA: KARNAK

At Karnak there are two of these avenues of sphinxes—or rather rams—one leading to the temple of Khons and the other, by far the best preserved, is shown in the picture. The ram was sacred to Amen-Ra, the great god and protector of Thebes, and consequently figures prominently in the decorations of the city. This avenue was erected probably by Rameses II, who placed between the paws of each sphinx a portrait statue of one of his predecessors. The obelisk at the extreme right of the picture is that of Seti II, king of the nineteenth dynasty. The great

the presence of Sir G. Maspero and others. The face was of the characteristic family type already seen in the mummies of his father, Rameses II, and his grandfather, Sety I — high-bred and aristocratic in its lines, with pronouncedly aquiline nose and strong, determined jaw. Surely in such discoveries the pure romance of exploration reaches its highest point, as we are brought face to face with the actual bodily presence of men whose actions have formed one of the most familiar and striking stories of history to countless thousands of readers.

The explorer, however, is but slightly concerned with the mere romance of his work; it is a byproduct. What he is searching for is the actual historical evidence, which will enable him to fill up gaps in his scheme of history, or the archeological evidence, which will help him to reconstruct the life of ancient times. In these respects modern exploration has given us several discoveries which have been of very high importance in their bearing upon our knowledge of the central period of the Egyptian empire.

A TREASURE THAT WAS NEARLY LOST

By the first of these, the discovery of the Tell-el-Amarna letters, archeology can scarcely be said to have reaped any great credit, though it has been, perhaps, the most far-reaching of all recent discoveries in its influence upon our conception of the life of the great nations of the world in the second millennium B. C., and the most valuable for the reconstruction of the lines of history.

About the end of the year 1887 a woman who was digging out dust for top dressing from among the ruins of the former palace of Amenhotep IV (Akhenaten) at Tell-el-Amarna came upon a heap of little tablets made of baked clay and inscribed with arrow-headed writing. She disposed of her interest in the find to a friend for the sum of ten piastres (half a dollar)! The tablets were hawked about from dealer to dealer, offered to at least two archeologists, and refused by them as being probably forgeries. Many were smashed or ground to dust in the process of being carried in sacks from place to place.

Finally, when an amount of priceless material, whose importance can never now be estimated, had been forever lost, the scientific world tardily awakened to some conception of the value of the tablets, and the bulk of what remained was acquired by the museums of Berlin and Cairo and the British Museum, a few scattered tablets finding their way into private collections. The loss incurred by the apathy of official archeology can scarcely be overestimated, for the tablets proved to be from the archives of the Egyptian Foreign Office of the fifteenth century B. C., and contained correspondence from the kings of Mesopotamia and the vassal princes and residents representing Egypt in Syria during precisely that period of Egyptian history which is being more and more recognized as the crisis of the fortunes of the empire.

The earlier letters date from the reign of Amenhotep III, the most magnificent king of the great eighteenth dynasty, and are full of interest as revealing the close and constant communication which prevailed among the kingdoms of the ancient East; but the greater part of the correspondence belongs to the reign of Akhenaten, the son and successor of Amenhotep III and the most interesting and pathetic figure of Egyptian history.

Amenhotep III, a luxurious, broad-minded, and lavish monarch, who expended in works and habits of splendor the great resources of the empire acquired by his warlike ancestors, had imbibed a great liking for the Semitic customs and ideas brought into the land by the numerous captives and hostages drawn from the Syrian tribes during the long wars and developed by the years of peaceful intercourse which followed. He married an Egyptian lady, not of royal birth, Queen Tyi, a woman who deserves to rank with Queen Hatshepsut as one of the two most remarkable women whom Egypt has produced (see page 978). Even during the lifetime of Amenhotep III Syrian conceptions of religion began to assert their hold, evidently largely because of the influence of Queen Tyi, and indications are not wanting that the cult of a form of solar deity called

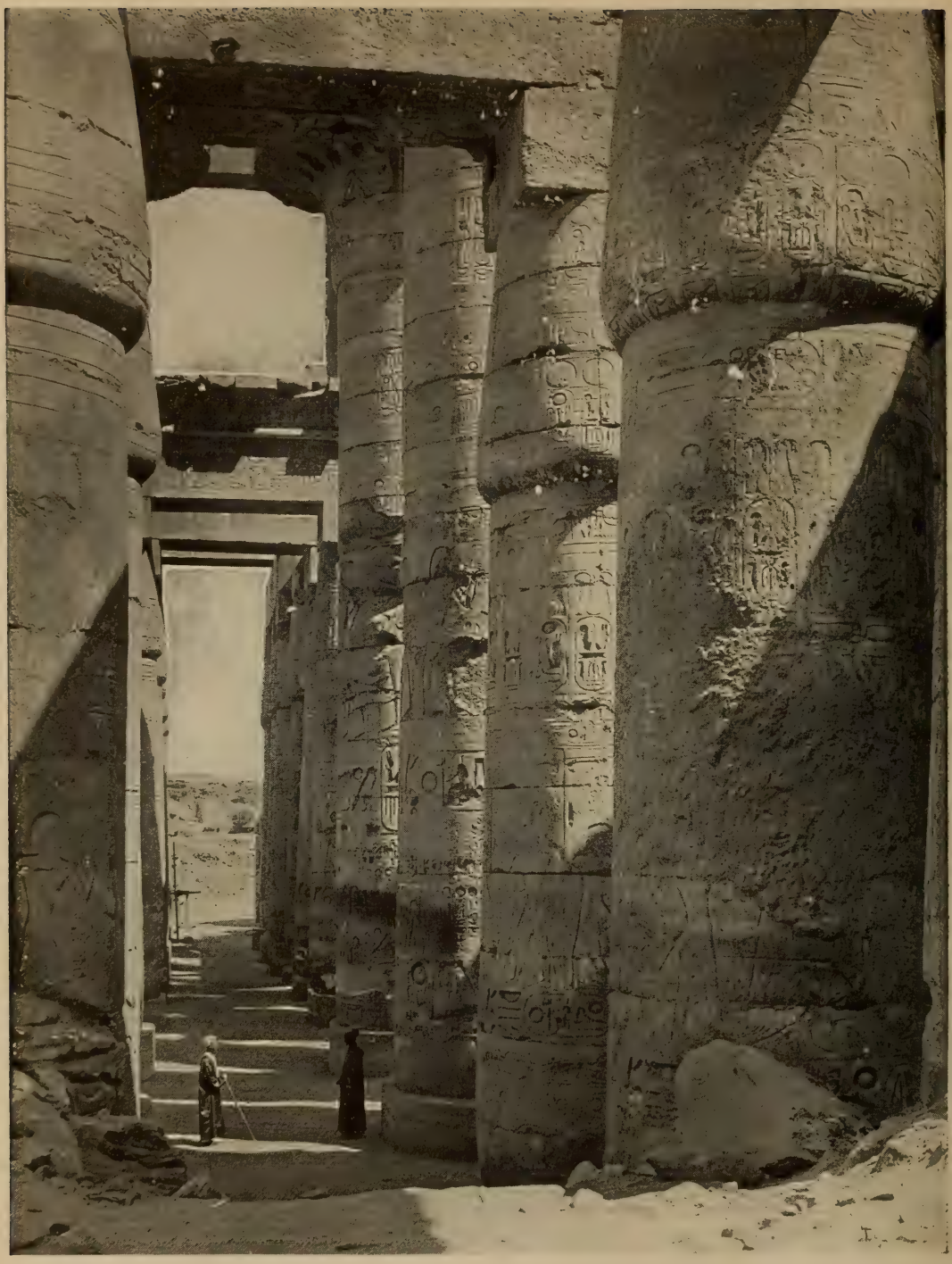

Photo by A. W. Cutler

LOOKING ACROSS THE GREAT HYPOSTYLE HALL OF THE TEMPLE OF AMEN-RA: KARNAK

The date is 1200–1500 B. C. There are 134 columns, and the two between which the men are standing in this photograph are 80 feet high and 33 feet in circumference. This great hall, one of the finest achievements of Egyptian architecture, was begun by Rameses I, but he only erected the pylon and one of the pillars, and it was left for his son, Sety I, to accomplish the great majority of the work, and for his grandson, Rameses II, to finish it. This hall is the largest single chamber ever reared by the Egyptians, and, although opinions differ upon its artistic merits, it is certainly among the most imposing buildings in the world. Almost all the sculpture on the columns is due to the completing hand of Rameses II.

Photo from Rev. James Baikie

GREAT COLUMNS OF THE NAVE AT KARNAK, WITH OBELISK OF TAHUTMES I

The first of the great soldier kings of Egypt was Tahutmes (Thothmes) I, the conqueror of Nubia and Syria. At Karnak, which is a modern name for the northern half of the ruins of Thebes, he built two great pylons or gateways before the temple of Amen-Ra, and in front of one of them set up the great obelisk, 76 feet in height, shown in the picture. Fine as this obelisk is, it is overshadowed by a still larger monolith erected by his great daughter, Hatshepsut, the Queen Elizabeth of ancient Egypt.

Photo from Rev. James Baikie

NAVE OF THE GREAT TEMPLE OF KARNAK: THEBES

On the capitals of each of the columns 100 men could stand, and the human figures in the foreground give an admirable idea of the size of these huge pillars. This nave is entirely the work of Sety I, as are the columns in the whole of the northern half of the hall. On the outer walls Sety had sculptured, in relief, scenes from his wars against the Shasu, the Libyans, and the Hittites, and in this series, over 200 feet long, are some of the most vivid battle pictures found in Egypt.

ANOTHER VIEW OF THE NAVE OF THE HYPOSTYLE HALL: KARNAK

Compared with this temple of Amen-Ra, even the greatest of modern religious edifices is insignificant. The hypostyle hall was the smallest of the three groups of buildings of which the temple was composed. It measured 170 feet by 329 feet and yet it occupied less than one-seventh of the entire length of the temple. A clearer idea of the size of this hall may be gained when it is stated that the great cathedral of Notre Dame at Paris could be put into it and there would still be plenty of room to spare.

the Aten was beginning to make headway at the court.

But when, on the death of Amenhotep, his son Amenhotep IV, a mere boy, ascended the throne, the full extent of this influence speedily began to make itself felt. Doubtless influenced at first to a large extent by his mother, Queen Tyi, but driven also by the convictions of his own keenly religious and even fanatical nature, Amenhotep IV drifted away from the accepted Egyptian creed and substituted for it as the court religion a purely monotheistic and spiritual system, the worship of the Aten, or vital energy of the solar disc.

He endeavored to thrust his new religion upon the nation to the exclusion of all other cults. The worship of Amen and the other gods of Egypt was proscribed, the temples were shut up, and even the name of Amen was hammered out of all inscriptions. As it occurred in his own name, the king discarded the title which his ancestors had made glorious, and named himself Akhenaten, "Spirit of the Aten." To complete the religious revolution, he abandoned Thebes and built for himself a new capital at Tell-el-Amarna, naming it "Khut-Aten," "Horizon of the Aten."

The importance of the change which the young king contemplated can scarcely be overestimated. It was the first attempt in human history to set up a genuinely spiritual religion and to substitute for the old polytheistic congeries of gods the conception of one universal deity—invisible, intangible, and spiritual. Akhenaten's religious conceptions were embodied in two beautiful hymns to the Aten which have come down to us, and whose authorship has, with great probability, been ascribed to the king himself.

THE HEBREW PROPHETS ANTICIPATED

A study of these hymns reveals the fact that he had reached very much the same beliefs with regard to the nature of God which animated the Hebrew psalmists of seven centuries later. Professor Breasted, of Chicago, who has presented a brilliant sketch of Akhenaten in his "History of Egypt," thus sums up the man and his daring attempt to revolutionize religion:

"Such a spirit as the world had never seen before—a brave soul, undauntedly facing the momentum of immemorial tradition, and thereby stepping out from the long line of conventional and colorless Pharaohs that he might disseminate ideas far beyond and above the capacity of his age to understand. Among the Hebrews, seven or eight hundred years later, we look for such men; but the modern world has yet adequately to value or even acquaint itself with this man, who in an age so remote and under conditions so adverse became the world's first idealist and the world's first individual."

Akhenaten, however, was a man born out of due time. The world was not ready for him and his advanced ideas. The empire of Egypt required at the moment not a religious idealist, but a practical soldier for its ruler, and the results of the king's devotion to his new ideas were disastrous in the extreme to the empire which he ruled. In the north of Syria the rising power of the Hittites was pressing upon the nations bordering upon the Egyptian empire; within the Syrian province of the empire itself revolutionary and rebel forces were at work, and the Tell-el-Amarna correspondence reveals to us the process by which the empire which the great soldier kings of the eighteenth dynasty had built up crumbled to pieces during a single short reign.

A PATHETIC CRY FOR HELP

Letter after letter came from the vassal princes and governors of Syria, detailing the progress of the enemies of Egypt and vainly imploring the king to send help. The letters of Rib-addi of Gubla, Abi-milki of Tyre, and Abd-Khiba of Jerusalem are infinitely pathetic in their hopeless loyalty. Again and again they sound in the king's ears the note of warning. If he will only bestir himself, only send them even a handful of Egyptian soldiers, the situation may yet be saved. Such a cry as the following, from a loyal town hard pressed by

Photo from Rev. James Baikie

ROYAL STATUES, PYLON OF TAHUTMES III: KARNAK

The holy of holies and one of the pylons of the temple of Amen-Ra were the work of another great warrior king, Tahutmes III, the half brother and nephew of Hatshepsut, whom he succeeded on the throne. On the walls of his additions to the temple he caused the stories of his victories to be inscribed, together with pictures of all the rare plants which he had brought back from his Syrian campaigns. This monarch has a peculiar interest for the people of America, as the obelisk commemorating his fourth jubilee, which he erected at Heliopolis, now stands in Central Park, New York.

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THE MOST BEAUTIFUL COLONADE IN EGYPT, LOOKING SOUTH ACROSS THE COURT OF AMENHOTEP III, LUXOR TEMPLE: THEBES

The temple of Luxor is one of the finest of the monuments of ancient Thebes and is of enormous dimensions, measuring 900 feet from back to front. The columns surrounding the open court shown in the picture are characteristically Egyptian. Each column is meant to suggest a cluster of papyrus buds, the shaft being the stems and the capital the buds, while the plain broad surface below is the band of linen holding the cluster together. The larger columns to the left, forming the nave of an unfinished hall, are of the open flower type, the capital showing the open bell of the lotus blossom. These columns were painted in the natural hues of the flowers they represented and the effect of these vivid colors under the intense blue of an Egyptian sky can easily be imagined.

enemies, moves the heart even yet, across all the centuries:

"And now Dunip, your city, weeps, and her tears are running, and there is no help for us. For twenty years we have been sending to our Lord, the King, the King of Egypt; but there has not come to us a word from our Lord, not one."

The letters drew no answer, or none that availed. Akhenaten was entirely engrossed with spiritual interests. One by one the Egyptian vassals, deserted and despairing, succumbed to the pressure of their enemies; and before the king died, still in early manhood, broken-hearted, one may imagine, by the failure of his life's work, practically the whole of the Egyptian empire in Syria had passed away from the rule of the Pharaohs. Within a generation or two his new capital had been abandoned and was falling into ruins, his name had become a hissing and an execration in Egypt, and the land had gone back to its old gods.

THE CITY OF THE HERETIC KING

One of the most brilliantly successful chapters of modern excavation is connected with the heretic king, his mother, and his capital of Tell-el-Amarna. Flinders Petrie's excavations on the abandoned site revealed a palace whose inclosure measured 1,500 by 500 feet and whose decoration showed the development of a naturalistic form of art unknown in Egypt save during this reign, while the great temple of the Aten proved to be a building 250 feet square and standing in an inclosure nearly half a mile long. The relics of the adornment of the palace were exceedingly striking—a love for brilliant color, for all forms of open air and plant life, and a desire to represent them not formally or conventionally, but in all the truth of nature, being the chief characteristics of the work.

In February, 1905, the American explorer, Mr. T. M. Davis, whose extraordinary good fortune had already led him to the discovery of the tombs of King Tahutmes IV and the great Queen Hatshepsut, discovered the tomb of Yuaa and Thuaa, the father and mother of that Queen Tyi whose influence played so great a part in Akhenaten's religious reformation. It had become almost an accepted belief that Tyi, whose influence was so pronouncedly pro-Mesopotamian, must have been herself of Mesopotamian origin. The tomb of Yuaa and Thuaa, however, revealed the fact that her parents were purely Egyptian; and the wealth of its occupants showed that, though probably not of royal rank, Queen Tyi's parents were at least people of considerable importance.

The tomb was intact and the objects it contained were as perfectly preserved as though they had only been shut up a few weeks before. Mr. Weigall describes his sensations on entering the place as being very much like those of a man who enters a town house which has been shut up for the summer. Armchairs stood about, beautifully carved and decorated with gold, the cushions on one of them stuffed with down, and covered with linen so perfectly preserved that they might have been sat upon or tossed about without injury. Two beds of fine design decorated with gold occupied another part of the chamber, while a light chariot in perfect preservation stood in a corner.

FRESH HONEY 3,000 YEARS OLD

Most startling of all was the discovery of a jar of honey, still liquid and still preserving its characteristic scent after 3,300 years! "One looked," says Mr. Weigall, "from one article to another with the feeling that the entire human conception of time was wrong. These were the things of yesterday, of a year or two ago."

But a still more brilliant gift of fortune was yet awaiting Mr. Davis's efforts. In 1907 he discovered in the Valley of the Kings a tomb whose inscriptions stated that King Akhenaten had made it for his mother, Queen Tyi. Toilet articles lying in the tomb also bore the queen's name, and the Canopic jars, or jars for holding the viscera of the deceased, bore, instead of the usual heads of the Canopic deities, four portraits of a female face of peculiar charm—evi-

dently that of the great queen. Accordingly it was assumed that the coffin which contained a mummy wrapped in gold foil and crowned with a golden vulture of exquisite workmanship was that of one of the two supremely great women of Egyptian history.

The inscription on the coffin, however, written in rare stones, gave the titles of Akhenaten, "the beautiful Child of the Sun;" and when the bones were sent for examination by Mr. Weigall to Prof. Elliot Smith as those of Queen Tyi, his answer was, "Are you sure that the bones you sent me are those which were found in the tomb? Instead of the bones of an old woman, you have sent me those of a young man. Surely there is some mistake."

There was no mistake, however, and the bones were not those of Queen Tyi, but of her extraordinary and unfortunate son, Akhenaten.

When the court returned to Thebes, after his death, his body had been brought back and laid with reverence in his mother's tomb; but when the reaction set in, and his memory was execrated as that of a heretic, priestly hatred pursued the dead king even to his grave. His body was felt to have polluted the chamber where his mother lay. Accordingly the tomb was opened again; Akhenaten's name was erased, so far as possible, from the inscriptions; Tyi's body was removed from the defiling neighborhood of her son's mummy and buried elsewhere—where is as yet unknown. This miserable revenge accomplished, the body of Egypt's great uncomprehended reformer was left to loneliness and shame—the usual fate of men who are too great or too far in advance of their time.

THE POSITION OF WOMAN IN ANCIENT EGYPT

The frequent mention of the influence exerted upon the course of Egyptian history by the two great queens, Hatshepsut and Tyi, leads us to consider briefly the subject of the position of women in the kingdom of the Nile Valley during the dynastic period. The habitual view of the modern mind with regard to the status of women in the ancient kingdoms of the East has been that it was fundamentally contrasted with the position accorded to them in Western lands.

"In the West, woman is the companion of man; in the East, his servant and his toy." Like most epigrammatic statements, this statement of the case has more point than fairness. Certainly it is unfair to the chief Eastern nationalities during the period of their greatness, however much it may apply to them in the period of their luxurious decadence.

As Erman has pointed out, the position of woman is very much the same in all nations which have reached a certain degree of culture, unless that position is affected by particular religious views such as those of Mohammedanism or Christianity. "As a rule, one woman is the legitimate wife and mistress of the house; at the same time the man may, if his fortune allow it, keep other women, and it is generally considered that the slaves of the household belong to him.

"This state of things, which appears to us most immoral, does not seem so in the eyes of a primitive people; on the contrary, the slave feels it a disgrace if she does not 'find favor' in the sight of her lord." On the whole, this view, which readers of the Bible will recognize as that of the Hebrew patriarchs, is that which obtained in ancient Egypt during the historic period.

It coexisted, however, with a much higher sentiment of respect for womanhood, and with a position of much greater influence for women than one would have imagined possible under such conditions.

THE REVERENCE FOR MOTHERHOOD

There existed in the Egyptian mind a sentiment that could almost be called reverence for womanhood, particularly in respect of its great function of motherhood—a sentiment which is much more akin to our modern Western view than anything else that we meet with among ancient peoples.

The mother was respected for her supreme share in the life and upbringing of her children, and for all the self-sac-

Photo by A. W. Cutler

TWO COLOSSI OF RAMESES II IN THE TEMPLE OF LUXOR: LUXOR

Up and down Egypt, at almost every temple, can be found some evidence of the activity of Rameses II, and his portrait statues are innumerable. He seems to have been a character of whom the Egyptologist gets a little tired. Writing about him, Mr. Baikie says: "When Rameses II laid hands upon a building, it was not to complete another's work and give the glory to the man who really deserved it; it was to steal the work of better men than himself and to batter his own eternal cartouche in upon their inscriptions, regardless of the truth. The most valuable records have been ruthlessly falsified by being appropriated to the vain-glory of that sublime egoist."

Photo from Rev. James Baikie

COLOSSUS OF RAMESES II: LUXOR

Rameses II, one of the best known of all the kings of Egypt, was the third sovereign of the nineteenth dynasty and reigned for 67 years. The earlier years of his reign were passed in almost constant warfare against the Nubians, Libyans, Syrians, and Hittites, the latter being his most redoubtable foes. After 20 years' fighting, Rameses entered into an offensive and defensive alliance with them and subsequently married the daughter of the Hittite king. The activity of this monarch as a builder was remarkable and his hand can be traced over the length and breadth of Egypt. His two finest works were the rock temples of Abu Simbel and the completion of the great hypostyle hall at Karnak. His wife, Nefertari, stands in the shadow behind his leg (see next picture, page 1003).

rifice which is essentially involved in true motherhood, and from the very earliest days the child was carefully indoctrinated with the duty of reverencing and loving the mother who bore and nourished him. "Thou shalt never forget," says the wise Ani in his "Instructions," "what thy mother hath done for thee. She bare thee and nourished thee in all manner of ways. If thou forgettest her, she might blame thee; she might lift up her hands to God, and he would hear her complaint."

So strong was this sentiment that on the tombs of the Old Kingdom the mother of the deceased is, as a rule, represented together with his wife, while his father rarely appears. Further in the funerary inscriptions of later times it is the usual custom to trace the descent of the dead man on the mother's side rather than on that of the father. We read of "Ned-emu-senb, born of Sat-Hathor; of Anhor, born of Neb-onet; or of Sebek-reda, born of Sent; but who were the respective fathers we are not told or they are only mentioned incidentally." Even when the father is mentioned, it is the natural thing that the mother's name should accompany his. Thus the Middle Kingdom statuette which Sir Arthur Evans found in the palace of Knossos is inscribed as that of "Ab-nub, Sebek-user's son, born of the lady Sat-Hathor."

A CURIOUS SYSTEM OF SUCCESSION

In accordance with this view of the superior importance of the maternal relationship is the fact that in noble Egyptian families the general, though not invariable, custom was that the heir of the house was not the eldest son, but the son of the eldest daughter. Under the Middle Kingdom this rule prevailed to such an extent that the inheritance passed from one family to another through heiresses. He who married an *erpat,* or heiress, gained for his son the inheritance of his father-in-law; and these heirs on the distaff side, *erpate,* or hereditary princes, whose title is constantly displayed on their tombs, evidently formed the highest aristocracy of the land.

The principle was carried to curious and, to our minds, amusing lengths. Successive generations of Western nations

Photo from Rev. James Baikie

NEFERTARI, THE SISTER AND FAVORITE WIFE OF RAMESES II

She is clinging to the colossal leg of her husband's statue. This is a fine example of later Egyptian art (see preceding picture, page 1002).

Photo from Rev. James Baikie

THE RAMESSEUM, THEBES: FUNERARY TEMPLE OF RAMESES II

Perhaps the finest work of the reign of Rameses II was expended upon this great temple, which was to serve as the king's final resting place. Before it he erected a huge portrait statue of himself, 90 feet in height and 1,000 tons in weight, a fragment of which lies at the foot of the gateway, at the right of the picture. Beneath the four statues of Osiris, which stand at the entrance of the court before the hypostyle hall, were the store-rooms of the temple in which may be picked up to this day the leaden seals of the wine and oil jars bearing the king's name, which were broken off by the temple servants in the days when the Hebrews were living in Egypt before the Exodus.

ANOTHER VIEW OF THE RAMESSEUM: THEBES

Writing of the splendor of ancient Egypt, Mr. Baikie says: "The decoration of these temples was magnificent. We read of doors made of cedar and bronze, the woodwork overlaid with gold; of steles incrusted with gold and precious stones and inlaid with lapis lazuli and malachite, and of floors overlaid with silver; while the reliefs which still adorn the walls were brilliantly colored, and the inscriptions inlaid with colored pastes. A great Theban temple in its primal magnificence, with all the richness of its coloring still undimmed, and its adornments of polished granite, lapis, and malachite reflecting the brilliant rays of the Egyptian sun, must have been one of the most gorgeous structures ever reared by the hand of man."

THE ROCK TEMPLE AT ABU SIMBEL, NUBIA

This is perhaps the most remarkable of all the works of Rameses II. It is hollowed out of a great rock promontory which juts out into the Nile. The façade is about 100 feet wide and 90 feet in height. The two colossal figures on either side of the doorway, each 65 feet high, are, as usual, portraits of Rameses, while high above them the front is completed by a cornice of 21 dog-headed apes. Abu Simbel is situated on the west bank of the river, 174 miles south of the first cataract of the Nile.

ENTRANCE TO THE TEMPLE: ABU SIMBEL, NUBIA

Over the entrance is seen the figure of the hawk-headed god Horus, but the temple was dedicated to the great sun god of Egypt, Amen-Ra, and was so oriented that the first rays of the morning sun entered the doorway and, illuminating the two great halls of the interior, fell directly upon the images of the gods in the holy of holies. By the side and between the feet of the colossi are portrait statues of various members of the family of Rameses, including his wife, son, and two of his daughters. On the legs of the colossus at the extreme left are inscriptions scratched by foreign soldiers in the Egyptian army during the reign of King Psamtik, about 600 B. C. One of these, in Greek, is of great interest, being among the earliest specimens of Greek writing known to us.

INTERIOR OF THE TEMPLE: ABU SIMBEL, NUBIA

Two great halls, out of which open eight small chambers, and the holy of holies form the interior of the temple, which measures 180 feet at its greatest length. The roof of the vestibule hall is supported by eight colored statues of Rameses, with the emblems of the god Osiris; the walls are covered with exceptionally interesting religious and battle scenes in the most vivid colors. One of these exhibits the characteristic vanity of Rameses, as it depicts him, as king, making humble offerings to himself as god! In the holy of holies were the statues Amen-Ra, Raharkht, and Ptah, the gods and protectors of the great religious centers of Thebes, Heliopolis, and Memphis; and, finally, Rameses himself, as god and protector of Nubia. A few paces away to the south is another small temple of lesser interest.

have laughed over the well-worn jests whose theme is the affection subsisting between a man and his mother-in-law. To an Egyptian these jests would have had no point at all. To his mind it was the natural thing that the connections of his family by his wife's side should take a deeper interest in his affairs than his blood relations.

When a man succeeded in life it was his maternal grandfather, of all people in the world, who was supposed to take the deepest interest in his success. "When he is placed at the head of the court of justice, then the father of his mother thanks God." The same source was turned to when influence was wanted to secure a position for a young aspirant. A young officer is received into the royal stables "for the sake of the father of his mother." Strangest of all, when the same young soldier goes to the wars, he leaves his property "in the charge of the father of his mother."

Such importance being ascribed to the relation of motherhood, we naturally find that great importance was attached to the state of marriage. The oldest of Egyptian books, the Precepts of Ptahhotep (fifth dynasty), declares that he is wise "who founds for himself a house and takes a wife." Marriage was regarded as the only satisfactory condition of life, to be entered upon at an early age; and all the evidence, monumental and literary, suggests to us that the ideal of the relationship between man and wife was singularly high, and that the husband treated his wife, not as his servant, but as his equal.

Of course, there were differences between ideal and practice, in Egypt as elsewhere. Doubtless the Egyptian was no fonder than we are of washing his domestic dirty linen in public, and we are not obliged to accept the theory that the relations of man and wife were ideally perfect in Egypt merely because the documents give us no evidence to the contrary. Still, there is something very engaging and suggestive in the common representation of an Egyptian household—the wife sitting beside her husband with her arm affectionately round his neck, while the children stand beside their parents, and the youngest daughter crouches by her mother's chair. A race which habitually chose to have its family relationships so pictured can scarcely have been false all the time to so tender an ideal.

TWO WIVES CREATE AFFECTIONATE CONFUSION

Polygamy was the rare exception, and it is very uncommon to find two wives ruling in the same house at one time. Ameny, one of the princes of Beni-hasan and a man of much importance in the reign of Amenemhat II of the twelfth dynasty, had two wives at the same time, and, curiously enough, they seem to have been on very good terms with one another—at least the one wife named her daughter after the other, who returned the compliment, and, one fears, caused unbounded confusion in the household, by naming all her three daughters after her associate wife.

Want of means would naturally restrain the average Egyptian from such a luxury as Prince Ameny could safely indulge in; but that this did not always operate is seen from an instance of polygamy at the other end of the social scale. One of the tomb-robbers of the time of the Ramesides possessed two wives, who are gravely named in the legal documents of his trial "The Lady Taruru and the Lady Tasuey, his second wife." Evidently a luxurious as well as a light-fingered gentleman.

Men of the upper classes, as in all Eastern countries, had their harems, where the women of the house lived a more or less secluded life, though there appears to have been but little of that jealous seclusion of them which obtains in Mohammedan countries. In the tomb of the Divine Father Ay, a priest of the eighteenth dynasty who held the throne for awhile in the decadent period after the death of Akhenaten, there is a representation of the women's apartments which shows how the members of the harem were supposed to occupy their time. We see them eating, dancing, playing music, or dressing one another's hair, while the rooms behind their living apartments

THE THIRD TEMPLE: ABU SIMBEL, NUBIA

This temple, the most northerly of the group at Abu Simbel, is separated from its fellows by a deep ravine. It is on almost as large a scale as the temple of Amen-Ra, and was dedicated to the goddess Hathor. The portrait statues, 33 feet in height, which decorate the façade, represent Rameses II and his sister and favorite wife, Nefertari.

have plentiful stores of harps, lutes, mirrors, and wardrobes.

THE SIZE OF PHARAOH'S HAREM

Pharaoh himself appears in all ages to have been the possessor of a large harem. In the wonder tale of the wizard Zazamankh, King Seneferu is recommended by the magician to select twenty of the fairest girls of his harem to row him in his boat on the lake; and no doubt succeeding monarchs were not behindhand in the number of female dependents who were attached to the royal household.

Under the empire the harem was supervised by an elderly matron, and was administered by high officials—"the governor of the royal harem," "the scribe of the royal harem," "the delegate for the harem"—while a number of slaves watched over the ladies and guarded them from undue intercourse with the outside world.

The inmates of the harem were drawn from many lands; and while some of them were Egyptian girls of noble rank, many were foreign slaves. The scale to which such an establishment could attain is illustrated by the case of Amenhotep III. When the King of Mitanni sent him his daughter Gilukhipa in marriage, the young lady was accompanied by a train of 317 maidens, who were no doubt added to the royal harem. This little army of attendants attached to a single queen out of several shows what a crowd of women must have been lodged beneath the palace roof.

The case of Amenhotep is not exceptional, though he was a monarch of very magnificent tastes. The fact that Rameses II has left lists of more than 100 sons and 50 daughters proves that, as Petrie remarks, "his concubines were probably as readily accumulated as those of an Arabian khalifa."

AN EARLY SUFFRAGETTE PLOT

In these enormous assemblages of idle women there lay a great source of danger to the state. The harem has always been a fertile ground for intrigues and plots. Favor shown to one wife or to her children unites the others in a common grievance, and the result is generally some plot against the reigning king or an attempt to secure the succession for some one who is held to have been overlooked. Such plots were not wanting in ancient Egypt.

We have a very full record of the process against certain ladies and princes of the harem of King Rameses III of the twentieth dynasty, which exhibits the harem intrigue in all its familiar features. Officials of the harem are bribed, messages are sent out to officers of the troops from the secluded ladies, inviting the help of the army to overthrow the king and set up a pretender, and the resources of witchcraft are called in to insure the success of the scheme. In this case even the discovery of the plot did not put an end to the machinations of those concerned. The judges in the trial were tampered with, and the result was a highly discreditable exposure of the corruption of the Egyptian bench as well as that of the harem.

Of course, the great majority of these ladies were never regarded as the legitimate wives of the king. The title of "great royal wife" was reserved for the chief among them. Even though the king might, for reasons of state, contract an alliance on equal terms with the daughter of a foreign sovereign, his chief wife was still a native Egyptian—in most cases, though not invariably, of royal descent.

Gilukhipa, for example, Amenhotep's Mitannian queen, though doubtless a personage of great importance in the state, occupied an inferior position to the favorite wife, Tyi—a native Egyptian, not even of royal birth, whose influence over her husband and her son we have already seen to be supreme. Rameses II was married to a Hittite princess, "Maat-neferu-ra," or "Dawn;" but his chief wife was the princess Nefertari, of the royal Egyptian line, while in addition he was married to several of his own numerous daughters.

INTERMARRIAGE WITH SISTERS

Such alliances, which seem utterly abhorrent to our minds, were by the Egyptian looked upon as both natural and de-

Photo by A. W. Cutler

THE PAVILION OF RAMESES III AT MEDINET HABU, PLAIN OF THEBES, AS SEEN FROM THE FIRST COURT: DATE ABOUT 1200 B. C.

Before his temple at Medinet Habu, Rameses III built a palace of sun-dried brick, which has now disappeared, all that is left being the stone entrance tower usually known as the Pavilion. This edifice is unique in Egyptian architecture; its three stories, flat roof, and surrounding battlements suggest that it was copied from a Syrian *migdol*, or watch-tower, and may have been built as a memorial of some campaign against the Philistines and their allies. The walls of this pavilion are decorated with scenes showing the king in the privacy of his harem.

Photo by A. W. Cutler

ONE OF THE MOST SPIRITED EXAMPLES OF ANCIENT ART IN ALL EGYPT

This is one of the pylons of the Great Temple built by Rameses III at Medinet Habu, Plain of Thebes, about 1200 B. C. It shows Rameses in two hunting scenes. In the upper one he is hunting deer, in the lower one wild bulls. Below are the huntsmen who accompanied the king.

TEMPLE OF RAMESES III: MEDINET HABU, EGYPT

This is one of the best preserved temples in Egypt, never having had to provide stone for buildings of later date. Erected as a mortuary temple for the king, it is entirely the work of one reign and represents the last achievement of the great builder kings. On the walls of the temple, which is about 500 feet long and 160 feet wide, are inscribed a record of the war of Rameses against the Libyans, Syrians, and the "People of the Sea," probably the Cretans, together with all the other events of his reign. This forms the most complete historical summary of the reign of any Egyptian king that has come down to us.

sirable. Marriage with a sister was held to be the sensible arrangement. The gods themselves had set the example, for the brothers Osiris and Set were married to their sisters, Isis and Nephthys. Thus King Aahmes of the eighteenth dynasty married his sister, Aahmes Nefertari; Tahutmes I married his sister, another Aahmes, and Tahutmes IV contracted a similar alliance, while we have seen that our rules of consanguinity were even further disregarded by Rameses II in his marriages with his own daughters. How such continual inbreeding produced for hundreds of years successive lines of kings on the whole so virile and energetic as the average Pharaoh is somewhat of a problem.

In the strange alliances we have a reflection of the important position assigned by the Egyptians to women and the stress which was laid on the female line in the matter of inheritance. The royal title of a king was doubly confirmed by his marriage with his sister of the same royal solar stock as himself, and in the case of a king who was the offspring of a marriage with an inferior wife, his title was only held to be secure when he had married a lady of genuine royal descent on both sides—very often his half-sister by the father's side.

So great was the importance attached to the female line that even an usurper could legitimize his accession to the throne by marriage with a princess of the royal house. Thus after the *débâcle* which succeeded the disastrous reign of Akhenaten, when the successful general Horemheb seized the crown, he acquired a legal title to the throne by marriage with the princess Nezem-mut, sister of Akhenaten's queen. The royal lady was advanced in years, but she was still of the true solar stock, and his union with her was held to make Horemheb's succession quite legitimate.

WHAT DID THE BRIDE THINK OF IT?

The influence of the chief wife was evidently very great. Amenhotep III has left documentary evidence of his great attachment to his wife Tyi in the scarabs, which still record for us her name and descent and eloquently suggest the pride which he took in his clever consort. "She is the wife of a mighty king, whose southern frontier is as far as Karoy, his northern as Naharina." More convincing still is the fact that, on the very scarab which records the king's marriage with the Mitannian princess Gilukhipa, "the royal wife, the mighty Lady Tyi, the divine one," is mentioned on equal terms with the king before the new queen is spoken of. What poor Gilukhipa thought of it is another story.

Even after the death of her husband, the chief queen still occupied her unquestioned position at court, was named "royal mother," and had her own special property, under separate management; while some of the queens, notably Aahhotep and Aahmes Nefertari, the foundresses of the eighteenth dynasty, had divine honors paid to them after death for many generations.

On the whole, though there are certain features, such as their loose ideas in the matter of consanguinity, which shock our modern sense of morality, the ideas and the practice of the ancient Egyptians in respect of the position of woman are remarkably advanced and rational, comparing very favorably with those of the great nations of classical antiquity. Woman was to the Egyptian not the slave of man or the minister of his pleasures; she was his companion, his fellow-worker on very equal terms, often his adviser, not infrequently his ruler.

Family life was accorded the position of importance which it deserves, and, as always where such a fact obtains, woman held her unassailable position of respect and usefulness in the eyes of all decent men. Especially the relation of parents and children presents one of the most pleasant and wholesome features of Egyptian life. There were dark shadows, of course, on the picture, and immorality was not unknown in Egypt any more than in other lands; but the Land of the Nile has little to fear from a comparison with any other nation of antiquity in respect of its treatment of womankind.

Our survey of the results of modern exploration in Egypt must close with a brief mention of the light, such as it is, which has been cast upon the question

THE PYLONS OF THE TEMPLE OF ISIS: PHILÆ

About the year 350 B. C. the last of the native kings of Egypt, Nekhtnebf, built a temple to Isis on this beautiful island in the Nile. Most of this temple, however, was destroyed by floods, and the present structure is mainly the work of the Ptolemies. The fine colonnades leading up to the temple date from Roman times; that on the left is complete, being 300 feet long, with 31 columns, each 16 feet high; that on the right is unfinished, having but 16 columns. Through the central gateway can be seen a portion of a second pylon leading into the holy of holies.

IN THE COURT OF THE BIRTH-HOUSE: PHILÆ

Opposite this row of beautiful columns and between the two pylons stood the birth-house, a small accessory chapel, deriving its name from the fact that one of its rooms contained reliefs of the birth of Horus, the son of Isis, and her brother and consort, Osiris. The worship of Isis centered in the island of Philæ and was the most successful of the pagan religions in maintaining itself against Christianity. So powerful were the priests of Isis that, despite an edict of Theodosius in 378 forbidding pagan services in all the Egyptian temples, the cult of Isis flourished at Philæ until about 560, in reign of the Emperor Justinian.

PART OF THE GREAT COLONNADE: PHILÆ

Note the elaboration of the capitals of these pillars, so different from the severe simplicity of those at Karnak and Luxor. On the wall behind appear reliefs which at first sight seem characteristically Egyptian, yet they contain frequent references to Roman emperors, to Augustus and to Tiberius, in whose reign Christ was crucified. In Egyptian, Philæ was known as Pilak—the angle island.

Photo by A. W. Cutler

THE SUBMERGED RUINS OF THE TEMPLES OF PHILÆ, NEAR ASSOUAN

Art and sentiment have been sacrificed to the commercial welfare of modern Egypt. With the completion of the great dam at Assouan, the waters rose over the island of Philæ. The tops of most of the buildings remained above the water level all the year round until the dam was raised another 26 feet, when—excepting from July to October—the temples were entirely submerged. Though this constitutes a great artistic loss, the gain to Egypt, through the conservation of these life-giving waters in a rainless land, is estimated at $15,000,000 annually.

of the Exodus of the Israelites by the discovery of the famous Stele of Merenptah. It is well known that Merenptah, son and successor (1234–1214 B. C.) of the great Rameses II, is the king in whose reign the majority of Egyptologists have concurred in placing the Exodus, though the opinion is held by some that an earlier date, in the preceding dynasty, is preferable. Up till the year 1896 no unequivocal reference to the people of Israel had ever been found on the monuments, the earlier identification of the Hebrews with the Aperiu mentioned in the eighteenth dynasty inscriptions having been finally abandoned by general consent as untenable.

WHEN DID ISRAEL COME OUT OF EGYPT?

In 1896, however, the long-desired inscription came to light. In that year Professor Petrie excavated the remains of the funerary temple of Merenptah on the western plain of Thebes. Among other finds of greater or less importance, he discovered a large black granite stele (memorial pillar) of Amenhotep III, engraved with a description of the erection of his own funerary temple, now represented only by the well-known Colossi (see page 982). On the rough back of this stele Merenptah had engraved a long inscription, which proved to be of great historical importance.

It related to the victory which the king gained in the 5th year of his reign over the army of Libyan invaders which had been devastating western Egypt. The details of the story in the main follow lines already familiar from other sources; but evidence is added that the victorious king followed up his victory by a campaign in Syria, in which a number of towns in Palestine were captured and sacked. The part of the inscription in question runs as follows:

> "Seized is the Kanaan with every evil;
> Led away is Askelon,
> Taken is Gezer,
> Yenoam is brought to nought,
> The people of Israel is laid waste,
> Their crops are not."

Unfortunately this inscription, so long sought for, only seems to add to the confusion. The mention of Israel in connection with Palestinian towns makes it evident that in the reign of Merenptah there were Israelites in Palestine, and the fact that their name occurs next to that of Yenoam suggests that they were in north Palestine; but, if the Exodus took place in the reign of Merenptah, no room is afforded for the wanderings of the Israelites in the desert, occupying, according to the biblical records, many years. On the other hand, no earlier date can be suggested for the Exodus which does not encounter insuperable objections on other grounds.

We are faced with the fact that the reign of Merenptah seems the only possible point at which the Exodus can be fitted into the historical scheme, while yet at that time there were already Israelites living in Palestine in sufficient numbers to render their overthrow a matter worthy of record in an important historical inscription. The only suggestion which seems in the least to meet the case is that offered by Petrie and Spiegelberg, namely, that when the family of Jacob came down into Egypt in the time of Joseph the migration was not so complete as we have supposed. Some members and dependents of the family must have remained behind in Palestine, and it was their descendants who were overthrown by Merenptah in his Syrian campaign. This supposition is not without its own obvious difficulties, but it seems to remain at present the only possible solution of the new enigma which has been raised by Professor Petrie's discovery.

Further exploration may yield us more light upon the subject. Meanwhile we have to be content with the bare fact that an unmistakable mention of the Israelites has at last been found on an Egyptian monument of the period in which the Exodus is believed to have occurred, though the mention is such as to puzzle rather than to enlighten us.

RECONSTRUCTING EGYPT'S HISTORY

The Work of the Egypt Exploration Fund

By Wallace N. Stearns

A THOUSAND miles of river in the midst of a valley of varying width—at the most 13,000 square miles of arable land. That was the physical basis of ancient Egypt. Nowhere is there to be found a finer instance of a country snatched from the sea by the gradual silting up of a channel: a flowing stream, a belt of green, a strip of upland, foothills and gullied slopes pre-faced and interspersed by arid waste, the boundless desert.

Through the genius of the engineer Egypt is being born again. In her awakening the land of the Pharaohs is again to play a rôle among the nations. The filling up of the Assouan dam began November 26, 1906. Statistics attest the usefulness of the construction. In 1877, in which year low Nile occurred, over

Photo from Egypt Exploration Fund

A CAKE OF BREAD, PROBABLY 3,500 TO 4,000 YEARS OLD, FROM DÉIR-EL-BAHARI

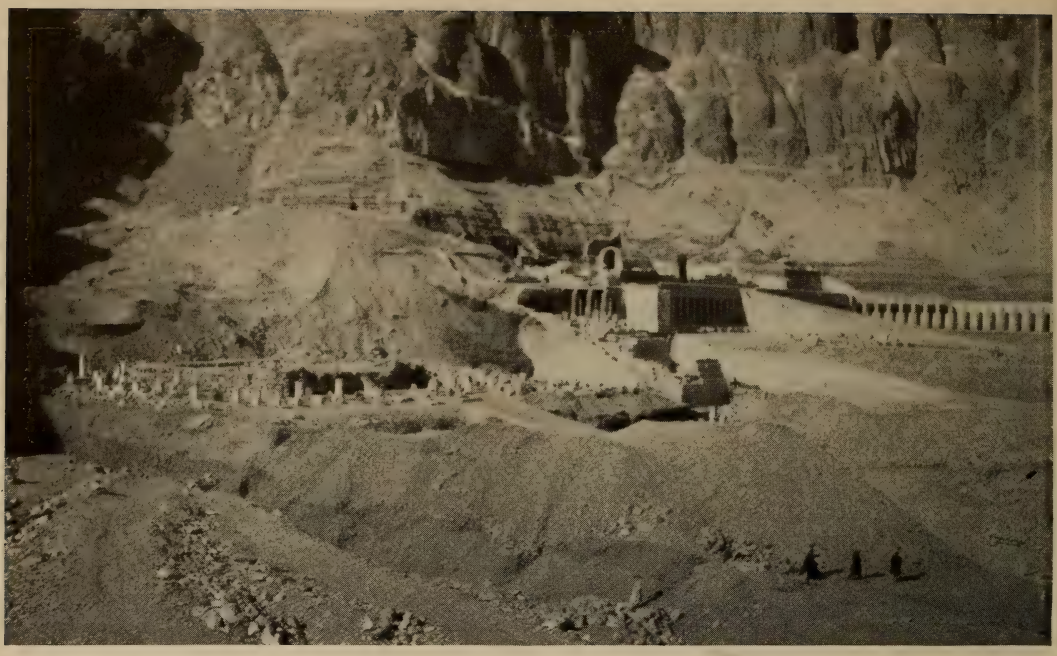


Photo from Egypt Exploration Fund

DEIR-EL-BAHARI

On the left is the great temple of Mentuhotep II of the eleventh dynasty, and on the right the even grander temple of Queen Hatshepsut, built 500 years later (see pages 980 and 981).

1,030,000 acres of tillable ground were left without water supply. In 1907, also a year of low Nile, only 115,756 acres were deprived of water—10 per cent of that so left 30 years before. The raising of the dam 16½ feet and a corresponding rise in the water level of 23 1/10 feet doubles the capacity of the dam and adds 1,000,000 acres to the tillable land of the delta; that is, water will be at hand in the summer months, when it is most needed.

The reclamation of the land, an economic necessity, has created an emergency for the archeologist. Sites of ancient culture are being submerged (see page 1019), and by infiltration the soil beneath is becoming saturated, to the detriment and ruin of priceless treasures yet undiscovered. The rapacity of robbers and curio-hunters is fast adding to this waste, though against the latter precautions are availing much.

REAL KNOWLEDGE ABOUT EGYPT A NEW THING

Our knowledge of the Egyptians is a recent acquisition. Judging from the stories of the Greeks, the reputation of Egypt's wise men for profundity of learning, and possibly from a misconception of their environment, we had come to regard the Egyptian as ever engaged in battles or triumphal processions, or delving in the mysteries of existence—at all times austere and taciturn. The pyramid of Khufu, massive and awe-inspiring (see page 966); the great temple of Karnak, the mightiest colonnaded hall ever erected by human hands—these had stood as the witnesses for ancient Egypt (see pages 992 and 993).

Pharaoh, noble, and priest we knew. The voice of the common man had not yet been heard. But now both prince and peasant, rich and poor, are made to live again. From the sands of Egypt, the dust-heaps and rubbish piles of deserted cities, from buried temples and forgotten necropoles, new evidence is steadily coming to light. From the towns of the Fayum up the Nile to the Cataracts ancient sites have been explored. Naucratis, Tanis, Dendereh, Deshashe, Ehnasya, El-Mahasna, Tebtunis, El-Amarna, Deir-el-Bahari, and

Photo from Egypt Exploration Fund

EGYPT'S GREATEST QUEEN, HATSHEPSUT

Her life is one long record of kingly deeds. She discarded feminine attire, wore the crown, and assumed an artificial beard at her chin (see text, page 1036)

Abydos, Philæ, Elephantine, Memphis, and Thebes are among the old cities thus discovered or brought out in sharper relief.

At present interest centers at Deir-el-Bahari. Located west of the Nile, at Thebes, this site has become a Mecca for tourists. Here side by side stand two temples of the eleventh and eighteenth dynasties respectively. The earlier, that of Mentuhotep II (see page 1024) antedates the splendid temple of Queen Hatshepsut by 500 years (see page 1025). Of the earlier structure, though now in ruins, enough remains for archeological restoration. Between the two temples

Photo from Egypt Exploration Fund

THE TEMPLE OF MENTUHOTEP II, OF THE ELEVENTH DYNASTY, AT DEIR-EL-BAHARI

"On an artificially squared rectangular platform of natural rock about 15 feet high was reared the pyramid of the king—a dummy, for his tomb has not been found. Around the pyramid was an ambulatory, whose roof was supported by octagonal pillars, while its outside walls were decorated with scenes of religious festivals, processions, husbandry, and so forth. To the north and south were open courts, and the faces of the rock platform were riveted with large blocks of white limestone, some of them measuring 6 feet by 3 feet 6 inches, beautifully squared and laid. A sloping ramp led up to the platform of the temple, and was bordered by colonnades of 22 pillars, each inscribed with the king's names and titles" (see pages 980 and 981).

Photo from Rev. James Baikie

HATSHEPSUT'S TERRACED TEMPLE AT DEIR-EL-BAHARI

"Withers fittingly says of this temple: 'Except for the sculptures on its walls, the temple bears no resemblance to other sacred buildings. Lying at the foot of hills that rise sheer upward for 400 feet and constructed in three terraces, where the hills slope gradually to the plain, the slender colonnades appear to support the whole weight of the cliffs overhead. Its own columns are whitish, like mellowed ivory. The whole material of the temple is limestone, yellowed with age where the sun falls on it, still dazzling white in places of shade, and in either instance providing a surface on which the rich pigments of Egyptian art, faded or vivid, are displayed in astonishing beauty'" (see page 1027).

BAS-RELIEFS: HATSHEPSUT'S TEMPLE, DEIR-EL-BAHARI

"Hatshepsut's temple is really a tomb-chapel in memory of the royal personages buried in the adjoining sepulchers, . . . but Hatshepsut appropriated the entire edifice, allowing to the men of her family only the space strictly necessary. She called her temple "most splendid of all" and made it her biographer. Everywhere on its walls she engraved and painted pictures illustrating in detail her principal acts" (see pages 1027 and 1028).

there is a striking similarity. Both were included within one enclosure, both had porticoes of marvelous beauty and proportion, both were dedicated to Hathor.

THE BEAUTIFUL TEMPLE OF HATSHEPSUT

The larger temple, that of Queen Hatshepsut, is the product of an age great in achievement and noted for its beautiful creations. Withers fittingly says of this temple: "Except for the sculptures on its walls the temple bears no resemblance to other sacred buildings. Lying at the foot of hills that rise sheer upward for 400 feet, and constructed in three terraces, where the hills slope gradually to the plain, the slender colonnades appear to support the whole weight of the cliffs overhead. Its own columns are whitish, like mellowed ivory. The whole material of the temple is limestone, yellowed with age where the sun falls on it, still dazzling white in places of shade, and in either instance providing a surface on which the rich pigments of Egyptian art, faded or vivid, are displayed in astonishing beauty."

Hatshepsut's temple is really a tomb-chapel in memory of the royal personages buried in the adjoining sepulchers: Thothmes (Tahutmes) I; his daughter, the famous Hatshepsut; her brother and consort, Thothmes II, and her successor, Thothmes III. Thothmes I and Thothmes II really built by themselves, but Hatshepsut appropriated the en-

Photo from Egypt Exploration Fund

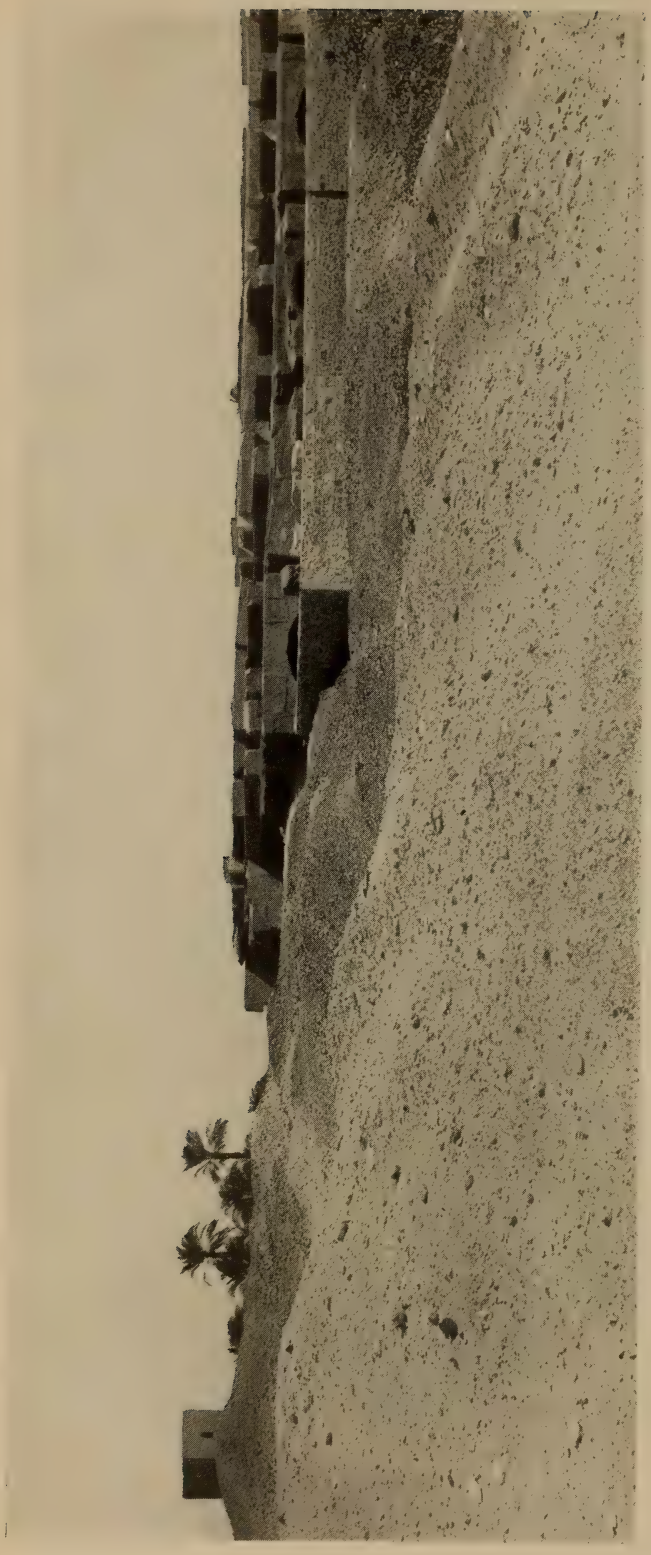
HATHOR SHRINE, FOUND AT DEIR-EL-BAHARI

"A perfect likeness of the living animal, reddish-brown in color, with spots shaped like a four-leaved clover. Traces yet remain of the gold that once covered head, neck, and horns. Between the curving horns is the lunar disk, surmounted by two plumes" (see page 1040).

Photo from Egypt Exploration Fund

HATHOR, THE COW GODDESS

"Beneath her head stands the dead king, whom she protects. The living king, whom she nourishes, kneels beneath her form. She is the nourishing mother of the young ruler as she is of the divine Horus" (see page 1041).



REAR OF SETY'S TEMPLE AS SEEN FROM THE OSIREION: ABYDOS, EGYPT Photo from Egypt Exploration Fund

tire edifice, allowing to the men of her family only the space strictly necessary. She called her temple "most splendid of all," and made it her biographer. Everywhere on its walls she engraved and painted pictures illustrating in detail her principal acts. Each successive terrace maintains its own character.

With the rise to the upper platform we come to oratories and to records intimately pertaining to Hatshepsut, and naively revealing the forceful personality of this most dominant monarch of her dynasty.

THE SHRINE OF THE COW GODDESS

Here on this upper terrace, sheltered by another of the matchless porticoes, is a shrine of Hathor. The covered vestibule is guarded on either side by Hathor-crowned columns, keeping watch and ward over the secret of the speos. In the wall-painting within, Hathor herself is represented under the form of a cow suckling a boy, protecting a man standing before her, each bearing the Queen's name.

Fragments of a most interesting sculpture were found on the lower platform of Queen Hatshepsut's temple. The complete relief showed the method adopted by the ancient Egyptians in the transport of the large obelisks. Three rows of boats—owing to the disregard for perspective, apparently formed in platoons, three groups

Photo from Egypt Exploration Fund

MERENPTAH, THE PHARAOH OF THE EXODUS, PLAYING DRAUGHTS: VIGNETTE ABOVE THE SEVENTEENTH CHAPTER, BOOK OF THE DEAD, FROM THE OSIREION

abreast rather than tandem—tow a huge barge on which the obelisks are loaded. Despite efforts to restore the broken wall, large gaps yet appear, due to the fashion of the natives to quarry among the ruins of ancient buildings, to the defacement of Hatshepsut's work in the interest of later rulers, to the depredation of the Coptic monks, and to the ravages of time.

The delicately carved and colored relief is rich in details—the pilot-boats riding free with their pilots taking the soundings, the taut cable, the swinging oars, the tender under the lee of the raft, and the rear line of craft carrying ministering priests and the royal emblems.

So under the conduct of more than a thousand men came in state to the abode of her father, Amen, at Karnak, the obelisk now standing and its fallen, broken mate, magnificent monoliths, of which the Queen says: "Their height pierces to heaven, illuminating the Two Lands like the sun disk. Never was done the like since the beginning."

Photo from Egypt Exploration Fund

LINES OF POTTERY: ROYAL TOMBS, ABYDOS

"Modern investigation . . . holds no site to have been really explored till every scrap of pottery which it yields has been collected, numbered, and studied, and the very earth and sand have been painfully riddled through a sieve. The result of all this laborious investigation is that instead of being confronted with a confused mass of facts . . . we are gradually being presented with a coherent picture of the history and the life of the various periods of the ancient Egyptian nationality from its earliest days" (see page 958).

Photo from Egypt Exploration Fund

CLEARING THE OSIREION

"Here was the entrance, by means of a deep shaft, into the underground waters leading to the heavenly Nile of the other world, and here, close to this deep shaft or well, was the National Chapel, or Temple of Kings, dedicated to Osiris, and close to it the celebrated Osireion, with its mysterious inclined passage leading to some unknown sacred goal beneath the National Chapel. The well leading to the underworld was discovered last year by Naville and Peet, under the auspices of the Egypt Exploration Fund" (see page 1052). M. Naville, in the white helmet, stands at the lintel, 40 feet below the desert level.

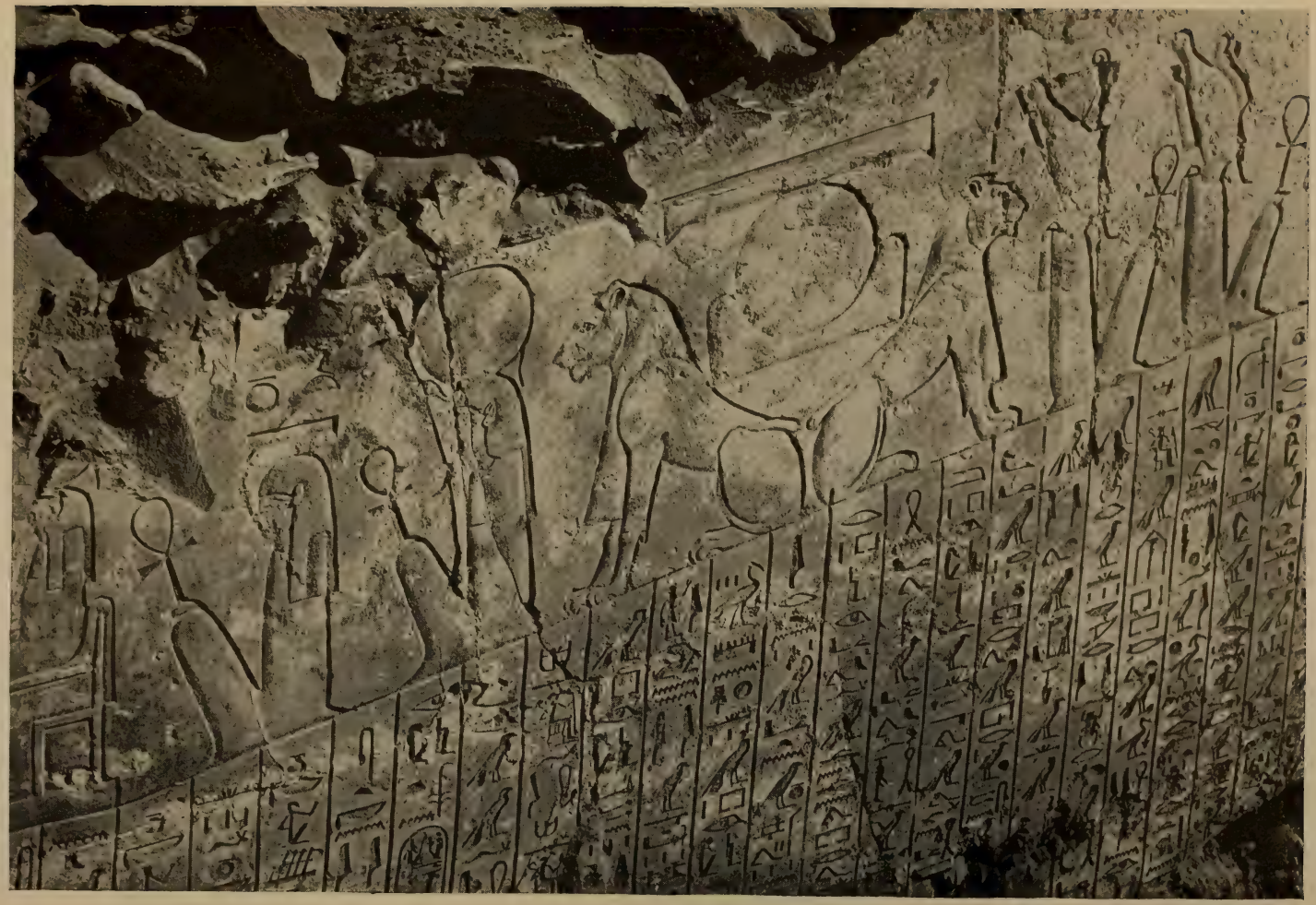


Photo from Egypt Exploration Fund

VIGNETTE AND SEVENTEENTH CHAPTER, BOOK OF THE DEAD, FROM SLOPING PASSAGE, OSIREION

The walls of this building are decorated with noble portraits of the god Osiris and the texts contain constant homage for his cult of the resurrection. No one doubts that Osireion itself was built in honor of this god of the future life. On its walls are the very decorations which Horus is recorded as having made in the tomb of his father Osiris, and its inscriptions from the Book of the Dead and Am-Tuat deal almost exclusively with this world of the after life.

Photo from Rev. James Baikie

SETY I ADORES THE GODS AND HAS HIS NAME WRITTEN BY THOTH ON THE TREE OF LIFE: TEMPLE OF SETY, ABYDOS

Every great Egyptian desired to be buried at Abydos, which, as containing the tomb of the god Osiris, was particularly sacred soil. Here Sety I erected a great temple as his last resting place, but did not live to complete it, this duty being performed by his son, Rameses II. The walls of this temple are covered with mythological reliefs, which are celebrated for their delicacy and beauty. They show each stage in the progress of the soul in the afterlife and form a mine of information about Osiris and his associate gods, whom the Egyptians called the "great ones of Abydos."

SEKHMET AND OSIRIS, RELIEFS FROM THE TEMPLE OF SETY I: ABYDOS

Sekhmet or Pakht was a goddess with the head of a lioness or cat and is distinguishable only with difficulty from Bast, another cat-headed deity. She represented the fierce heat of the sun, typified by the solar disk above her head, and was regarded as a bringer of misfortune. Osiris is here represented wearing royal garments and the crown of Upper Egypt, and carrying his symbol, the crook. He was one of the greatest of the Egyptian deities and the guardian of mankind in the state after death.

PORTRAIT OF SETY, TEMPLE OF SETY I: ABYDOS

Here we see Sety in the traditional costume of an Egyptian king. On his head is the royal helmet bearing the uræus, the serpent or asp sacred to the goddess Buto, protectress of the Pharaohs. The upper part of the body is bare but for the great golden necklace. The curious short kilt, peculiar to royalty, was worn either over or under a longer transparent skirt. This relief shows admirably the peculiar conventions of Egyptian art, which decreed that portraits must always be in profile, with the eye and the shoulders, however, in full-face view. The feet are always shown with the same side—that bearing the great toe—turned toward the viewer, while if an arm or leg is advanced it must be the one farther from the spectator.

Photo and copyright by Underwood and Underwood

THE MUMMY OF SETY I, IN THE MUSEUM OF CAIRO, EGYPT: HE LIVED EARLY IN THE FOURTEENTH CENTURY B. C.

"Most stately and kingly of all, Sety I, the father of Rameses, whose wonderfully preserved features, clear-cut and aristocratic, convey a remarkable impression of royal dignity" (see page 986).

THE QUEEN ELIZABETH OF EGYPT

In very truth Hatshepsut had the heart of a king. Her life is one long record of kingly deeds. Her inscription declares: "Hatshepsut, the divine consort, adjusted the affairs of the two lands by reason of her designs; Egypt was made to labor with bowed head for her." She discarded feminine attire, wore the crown, assumed an artificial beard at her chin, and it is rumored an ambassador at her court had an open road to her royal favor if the matter in hand were addressed to *his* majesty.

Hatshepsut is one of the great personages of history. Her sarcophagus, discovered in 1904 by Mr. Davis, now rests in the Cairo Museum. Hatshepsut belonged to the eighteenth dynasty, in which time Egypt was at the zenith. She possessed rare administrative power, tact, and diplomatic skill. She carried on the mines in the Sinaitic peninsula. She established potteries and glass fac-

tories that produced glazed ware and colored glass. Temples were built or restored.

A scientific expedition went to Punt, at the mouth of the Red Sea, or possibly across on the shore of Africa. On their return Theban troops went out to meet them; the royal flotilla escorted them to the landing stage of the temple, where the procession formed to bear the rich cargo, an offering to the god in thanksgiving for the successful outcome of so great a naval enterprise. And this was in the fifteenth century before Christ!

Collections were made of the fauna and flora of the land—giraffes, baboons, panthers, a hippopotamus, and horned cattle. Specimens of plants and trees were taken back. The precious trees were planted, or some of them, at Deir-el-Bahari, on the lower terrace, and a sacred garden was planned for them. Square trenches were cut in the native rock and filled with earth. In the course of his excavations Naville found the drainage wells, the mud they contained, and the vegetable refuse heaped within them. Furthermore, artists accompanied the expedition to make drawings of strange animals, fish, and plants of the country.

THE DIFFICULTIES OF EXCAVATION

Succeeding dynasties did little to change the Queen's temple at Deir-el-Bahari, aside from mutilations and some restorations. A landslide later buried a part of the site, and a Coptic convent on the highest terrace added to the débris. In 1890 scarcely a third of the great

Photo from Rev. James Baikie

TREASURE TROVE OF THE ARCHEOLOGIST: A MUMMY COFFIN

The coffins or mummy cases of the Egyptians were made to represent the natural form of the body, and were brilliantly colored, often displaying craftsmanship of the highest order. In most cases the coffin exhibited a portrait of the deceased, and in later times, especially during the Roman period, these were striking works of art.

Photo from Egypt Exploration Fund

THE LARGE BAKED POTTERY VESSEL OF THE FOURTH AND FIFTH DYNASTY SHOWN IN POSITION BEFORE IT IS REMOVED FROM THE BODY WHICH LIES BENEATH

The small pot of rough pottery was found with every burial, but no other objects except a few beads

temple of Hatshepsut was in view. The recovery of Deir-el-Bahari is due to the labors of the Egypt Exploration Fund and the genius of Edouard Naville. Due regard must be had also for the pioneer work of Mariette, 1858, 1862, and 1866, who got as far as the upper platform of Hatshepsut's temple.

In 1893 the Egypt Exploration Fund took up its work at Deir-el-Bahari. Here Mariette had carried out on a large scale his custom of heaping his rubbish close to the place from which it came. In this way unconsciously was buried deeper, under weighty rubbish heaps, a hall decorated with gigantic sculpture. Still less did he suspect that here, too, was the royal chapel of Thothmes (Tahutmes) I and the inner court, containing the immense white altar, the finest ever found in Egypt. The work, commenced in 1893, required 14 years to complete. M. Naville has left nothing for future students to do.

Photo from Egypt Exploration Fund

THE BURIAL POT HAS BEEN REMOVED, SHOWING THE HUDDLED BODY

WHERE TO FIND REAL DUST

It was a difficult site. The excavator is almost invariably confronted with the difficulty of disposing of his rubbish, especially at such a site as Deir-el-Bahari, where the temple is shut in between hills and necropoles. Here the débris had to be carried to an old clay-pit in order to run no risk of covering either building or tomb. This precaution, heavy task though it proved, doubtless saved the eleventh dynasty temple from burial beyond any hope of resurrection. Any one who took part in the clearing of Deir-el-Bahari will never see any dust worth mentioning elsewhere.

At a distance of 50 yards a visitor would hear a terrible hubbub, seeing nothing but an impenetrable haze of dust, from which would presently emerge a tram, visible at 10 yards, under the direction of a dust imp—another, a third, a hundred. Over the high embankment would plunge the loads, and the train, once started, rolled all day ceaselessly on its double track, save for the noon hour of rest.

The temple of Queen Hatshepsut has been reclaimed from the rubbish of ages

Photo from Egypt Exploration Fund

LARGE VASE CONTAINING 73 MUMMIFIED CATS FOUND AT ABYDOS

and now stands clear—ramp, terraces, and courts—and in a measure restored. Scattered stones have been set back in place. The famous historical reliefs are protected from further damage. The large platform of white limestone stands out nearly complete against the background of the yellow cliff in which the tombs were excavated.

In 1903 was discovered the second temple, near that of Hatshepsut. Smaller, inferior to the first, it is the funerary temple of Mentuhotep Nebhapet Ra, of the eleventh dynasty. On a rectangular base stands a pyramid flanked by a colonnade, the entire structure surrounded by a second colonnade only partly intact (see page 1022).

THE MOST BEAUTIFUL CULT IMAGE YET DISCOVERED

It is from February 7, 1906, however, that the fame of Deir-el-Bahari really dates; at least, in popular esteem. In a shrine 10 by 5 feet and 8 feet high there was found a life-sized statue of the cow-goddess Hathor, the largest and most beautiful cult image yet discovered intact in its shrine. The shrine was built and adorned by Thothmes III, but if we are to believe the cartouche engraved between the lotuses, the two figures are of his son, Amenhotep II (see page 1027).

The shrine is lined inside with slabs of sculptured limestone, but the marvel of the tomb is the statue itself, cut from a stone the full thickness of the animal and high enough to reach the top of her lofty horns—a perfect likeness of the living animal, reddish brown in color, with spots shaped like a four-leaved clover. Traces yet remain of the gold that once covered head, neck, and horns. Between the curving horns is the lunar disk surmounted by two plumes. A heavy metal necklace hung about the neck (see page 1027).

This is the mountain goddess, who from her cave came to the marshes, where she suckled the god Horus. Be-

neath her head stands the dead king, whom she protects. The living king, whom she nourishes, kneels beneath her form. She is the nourishing mother of the young ruler, as she is of the divine Horus.

About 30 miles north of Deir-el-Bahari is Abydos, remarkable for its location. The high cliffs form a deep recess some four miles across and two miles deep. Here are the temples and necropoles of Abydos. Heretofore Menes has stood a shadowy figure at the dawn of history, who merged the two kingdoms into one nation. Behind Menes other names have come to light. We see men, as trees, walking, yet we now know that Menes stands at the close of centuries and even millenniums of development.

EARLY BURIAL CUSTOMS

The earliest royal graves are simple, with no tumulus, and having two simple upright slabs, or stelæ. Osiris, who as king taught his subjects the arts of civilization, was set upon by the god Set and his companions and brutally murdered. The mutilated body of Osiris (according to a later account, his head only) was buried at Abydos, the Greek form of Abdu (Abidu), "Mound of the Osiris-head Emblem." Hence the early kings of the province of Thinis desired their burial to be at holy Abydos.

At Abydos are still earlier burials—oval tombs with crouched bodies surrounded by pots, some of which are very coarse (see page 1038); others are of better material, even with painted ornaments; most of them of red color with a black rim, and perhaps a few slate palettes or flint instruments. These earliest dwellers—with rude implements of stone, simple ornaments of stone, ivory, bone, flint, quartz, agate, and other like materials, living in dwellings of wattle—constitute one of the rarest finds in all the records of archeology.

These stupendous excavations call for equipment on a considerable scale. Work must be rapid. December 1 to April 1 marks the working year. Every moment is precious. Every carload must count. Every shovelful of earth must be carefully sifted wherever there is a possibility of a find. Even a basket brigade is sometimes pressed into use. As soon as some apparently valuable piece is located, workmen are called off, experts are sent in; every man is on guard. Carefully every inch of soil is watched as the last few baskets of earth are removed. Every fragment must be saved and laid away until everything has been recovered.

Think of the disappointment when, for example, a magnificent statue comes out headless. Think of the conjectures as to the whereabouts of the missing piece and the furor when, perhaps weeks afterward, the lost is found. There is an air of hushed expectancy, a suppressed excitement hovering over, that keeps men up under the most tense strain under which the work is of necessity conducted.

WHAT THE EGYPT EXPLORATION FUND IS ACCOMPLISHING

America has joined hands with the Old World in prosecuting this work. An American secretary, Mrs. Marie N. Buckman, has been assigned to the direction of the American office of the Egypt Exploration Fund, located in Tremont Temple, Boston. Wonderful are the results attained. Every student of history and literature, every student of the Bible, is vitally concerned in the confirmations yearly coming to light from the sands of Egypt.

There is need of haste. To extend the arable district of Egypt is an economic necessity. Accordingly the British government has erected at Assouan the great dam, whose 95-foot head has sent the waters of the Nile back over great areas of hitherto dry ground. Already a dozen great temples have been flooded, and ere long will be forever lost to sight. Already beautiful Philæ, at the head of the first cataract, is gone. The soil is becoming infiltrated, and the stores of treasures, especially the papyrus manuscripts, are being ruined, even before the waters cover the ground above.

Among the agencies engaged in the work of recovering Egypt, the Egypt Exploration Fund stands conspicuous. Headed by no less a world figure than the Earl of Cromer, with such names on

its rolls as Grenfell, Sayce, Thompson, Naville, Peet, Griffith, Hunt, Hogarth, and, for some time, Petrie, and a host of secretaries, this association has won the respect and confidence of governments and scholars. Their devotion to the work, their singleness of purpose, their sacrifice, their effective results, and the fact that no organization puts a larger per cent of its receipts into its work, all render the fund worthy of the esteem in which it is universally held.

THE SACRED IBIS CEMETERY AND JACKAL CATACOMBS AT ABYDOS

By Camden M. Cobern

Honorary Secretary Egypt Exploration Fund, in Egypt Season 1912-1913

I AM writing this in the Abydos camp, with six ibises under my cot and 16 more covering the floor. There has been a great "find" here, differing from anything ever before made in the entire history of Egyptian exploration, and today was the climax of it. Some months ago, when one of the excavators of the Egypt Exploration Fund here, which is this year under the general direction of Mr. T. Eric Peet, struck an Ibis cemetery, built some 2,000 years ago over a sixth dynasty human cemetery, every one knew a unique discovery had been made, yet no one fully realized how surprising and entrancingly interesting it was. No other discovery of the year in Egypt can equal it, I think, in archeological value. Ibises have been found before, but no such wonderful cemetery as this.

Mr. Leonard Park Loat was the fortunate man who discovered and opened this strange and in some respects mysterious burial place, and as a special favor he allowed the writer to help him a little in his happy task of uncovering these surprising treasures. Undoubtedly a worthy monograph may shortly be expected from his pen, authoritatively setting forth the history of the exploration and its bearings upon animal and bird worship among the ancient Egyptians; but meanwhile a little information concerning this astonishing discovery and a few suggestions which may sharpen interest in Mr. Loat's fuller report may not be inopportune.

Hypogeums of ibises have previously been found at various places in which some of the bodies were mummified, notably near Hermopolis Magna, an ancient city sacred to Thoth, and here at Shunet deb-hib, within the environs of this sacred city of Abydos, dedicated to Osiris, god of the Dead. But this particular burial place of the sacred ibis compares with all other burial places as the Tombs of the Kings compare with all other human cemeteries, and as the Apis Tombs compare with all other animal burial places.

HOW THE IBISES WERE BURIED

These ibises are as carefully mummified as the royal personages buried at Deir-el-Bahari, and if it had not been for the white ants, those most successful grave robbers of the earth, we should now be able to examine from this cemetery hundreds of these sacred birds in as perfect a state of preservation as when buried.

Their clay sarcophagi, which resemble in some respects canopic jars, but are much larger, are in many instances thoroughly well made and are exquisite in shape and quality of material. They are generally so large as to hold easily fifty or more full-grown birds, yet are symmetrical and smooth as vases—much better than the jars generally used in Palestine and elsewhere for child burials (see pages 1043 and 1045).

The burial wrappings, too, are really quite royal in the quality of material and

Photo from Egypt Exploration Fund

JARS FILLED WITH MUMMIFIED BIRDS IN POSITION IN THE IBIS CEMETERY

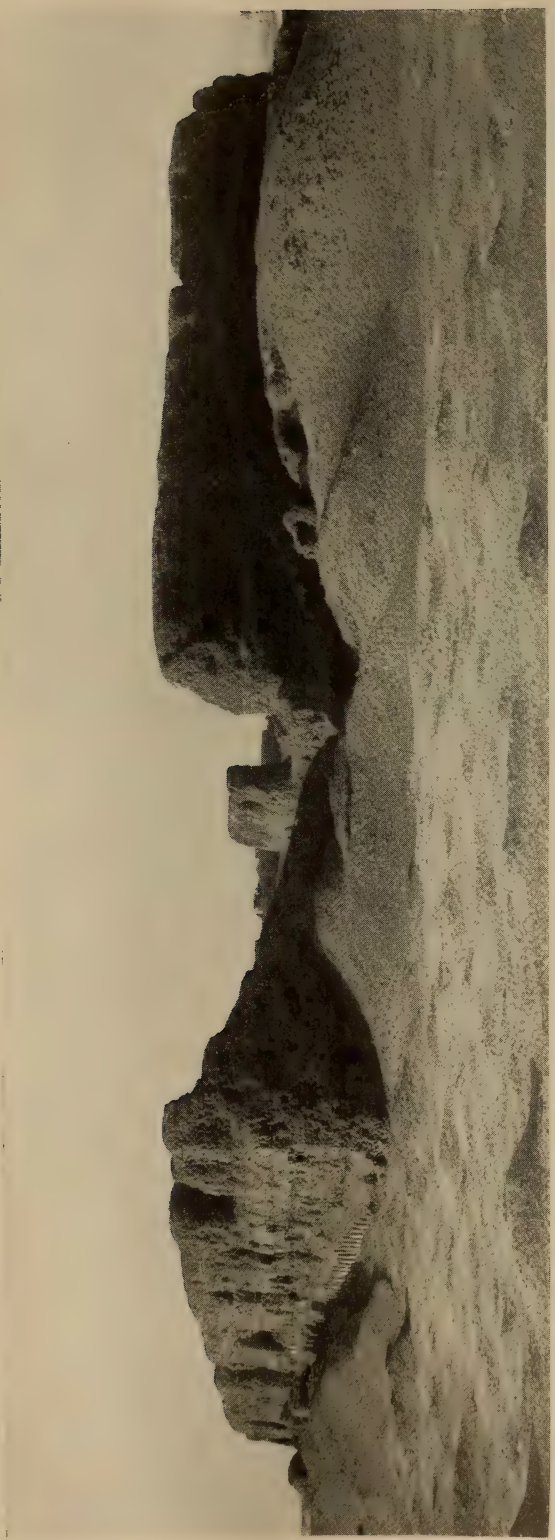
in the style and design of the outside interlaced mummy wrappings, and they are often made to represent the exact form of human mummies, even to the shape of the feet. These grave coverings are more carefully tailored and as handsomely and elaborately designed as the shrouds of Egyptian princesses. Very few, indeed, of the royal family ever possessed burial garments equal to some of them, the cloth being of finest texture and so perfectly manufactured that even its color is in some cases completely preserved (see page 1046).

These mummy wrappings have received the most elaborate and loving decorations — rosettes and figures of ibises, and royal crowns and other beautiful designs surprisingly artistic in their color scheme, being worked upon these "shrouds" by fingers expert in the finest needlework. The intricate interlacing of the black and white bands in geometrical designs recalls Plutarch's description, "The ibis was thought to bear some relation to the moon, from its feathers being so mixed and blended together, the black with the white, as to form a representation of the moon's gibbosity" (see page 1049).

GUILDS OF PRIESTLY UNDERTAKERS

These garments are so handsome and of such perfection of execution that the tapestries now sold in Egypt to adorn the walls of modern American homes cannot even compare with them. Only a guild of undertakers or tailors long trained to do this work could ever have succeeded in procuring such exquisite results. They could only have been made by a priestly or subpriestly guild, the members of which had after long experience acquired this perfection in their art. We see here that the undertakers connected with the bird-cult of Egypt had as careful training and were considered as important a part of the priesthood helpers as those who had oversight of the royal funerals.

This discovery opens up a new chapter in the history of bird worship in



SECOND DYNASTY FORT IN DESERT NEAR THE IBIS CEMETERY

Photo from Egypt Exploration Fund

This fort, known as Shunet-ez-Zebib, measures about 450 feet long by 250 feet wide, while its walls are 30 feet high. It was erected by Khasekhemui, the last king of the second dynasty, and is therefore more than 5,000 years old

Egypt. It shows a tenderness of regard and loving homage entirely unexpected. Even the feathers, sometimes with the purple sheen still brilliant, and the scattered bones of these creatures were carefully gathered up and put in mummy form, although the body itself had been destroyed. In one the eggs were also carefully preserved. It is in the realm of the old Egyptian faith that we must look for the explanation.

In the divine days after the reorganization of the heavens and the earth, when Ra left the earth to traverse in his golden barque the shining waters of the celestial ocean and to scatter his beams of light over the two lands, then the majesty of the god Ra spake unto Thoth: "Let us go, leaving heaven and my dwelling, for I will make something shining and resplendent in the underworld and in the land of the deep. There shalt thou register those who did wicked deeds as inhabitants, and there shalt thou imprison them. But thou art in my place and thou shalt be called Thoth, the representative of Ra. I also give unto thee power to send forth thy messengers." Thereupon the ibis, the messenger of Thoth, came into being.

THE VIRTUES OF THE IBIS

Such was the mythological creation of the divine bird. A twelfth dynasty artist has preserved for us his portrait of the ibis in the fourth of the Beni Hasan tombs. The plumage is white except head, neck, and extremity of the wings and tail, all which are quite black. The mi-

Photo from Egypt Exploration Fund

SECTION OF IBIS CEMETERY AND ITS POTTERY VASES, ALL FILLED WITH BIRD MUMMIES

raculous bird was beneficent in all his ways, destroying locusts, scorpions, serpents, and the noxious creatures which infested the country, and its searching out and destruction of these enemies to the growing crops and to man himself led to the profound respect which this messenger of a god enjoyed.

The 85th chapter of the Book of the Dead, called "The chapter of making the transformation into a living soul and of not entering into the Chamber of Torture," concludes: "I have done away with all my iniquity and I shall see my divine Father, the Lord of Eventide, whose body dwelleth with the god of light by the western region of the ibis." Hence this vast bird cemetery, 2,700 feet square, was established at Abydos, the vestibule on earth from whence to enter the kingdom sacred to Osiris and to the mysteries of the future world, and especially to the cult of the resurrection.

The discovery of the several crowns of Osiris, wonderfully worked, above some of these mummies favors this conclusion. It is also favored by the position which the ibis held in the Egyptian religion and by the fact that the two chief burials of ibises previous to this have both been in cities dedicated to the Osiris cult.

Every hope of immortality held by the ancient Egyptians rested upon Osiris, who had been killed by Set and his 62 fellow-conspirators, but had been brought back to life by the efforts of his wife Isis and his son Horus. The same magic which had brought Osiris to life again, if it could be exactly reproduced, could bring others from death to life. All the funeral ceremonies, all the pictures on the tombs, and all the chapters copied there from the Book of the Dead and the Book of Am-Tuat are for the purpose of imitating correctly these successful magical ceremonies which revivified Osiris.

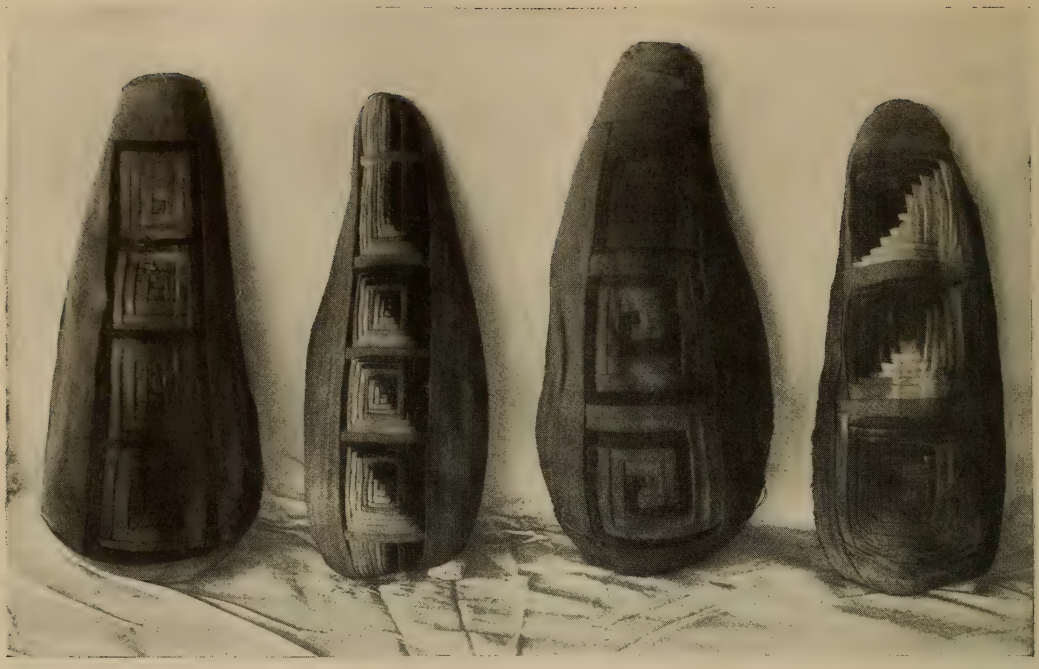


Photo from Egypt Exploration Fund

MUMMIFIED IBISES IN BLACK AND WHITE CEREMONIAL WRAPPINGS

"These grave coverings are more carefully tailored and as handsomely and elaborately designed as the shrouds of Egyptian princesses. Very few, indeed, of the royal family ever possessed burial garments equal to some of them, the cloth being of finest texture and so perfectly manufactured that even its color is in some cases completely preserved. These mummy wrappings have received the most elaborate and loving decorations—rosettes and figures of ibises, and royal crowns and other beautiful designs surprisingly artistic in their color scheme, being worked upon these 'shrouds' by fingers expert in the finest needlework" (see page 1043).

THE GOD WITH THE IBIS HEAD

It was in the form of an ibis that Thoth, inventor of astrology and mathematics, the god of wisdom and magic, had escaped from Set, the evil god of the underworld. This bird was dedicated to him and was indeed the hieroglyphic of his name as well as the hieroglyphic for "the soul."

To kill an ibis, as Diodorus tells us, was to commit murder and bring upon one capital punishment. The reason for this is seen in this bird's identification with Thoth, through whose magical wisdom Osiris had been brought back to life. One of the common titles of Thoth was "He of the nose," referring to the ibis beak, and he is generally represented on the monuments with an ibis head (see page 1050). The ibis was his ordinary pictorial representative and its meaning in religion can only be grasped as we understand Thoth's position among the gods, as the great magician who had invented the formulæ which, given to Isis, gathered together the scattered parts of the mutilated body of Osiris and worked the miracle of his revivification.

So when Horus was stung by a scorpion and died, Nephthys, sister of Isis, cried to Thoth, who came down from his sun boat and by his words of power brought him back to life again. What he did for Osiris and Horus he could do for all the myriads of the dead. If properly honored, he would assist these dead men each to become an Osiris, and underneath his bier, or close to the dead mummy form, we can always in the tomb pictures see this wonder-working, ibis-headed deity.

Why were hawks, shrews, jackals, and at least one beetle occasionally buried in

this ibis cemetery? Because all of these were intimately connected with the myth of Osiris and the cult of the resurrection. The hawk was always sacred to the sun-god ruler of the celestial world; the shrew was sacred to Horus, who, following the instructions of Thoth, tore out his own eye—the seat of the soul—and gave it to Osiris, his father, in order to renew his life; the jackal was the guide of the dead to the fields of the blessed; while the beetle was pre-eminently the living representative of a resurrection life.

THE JACKAL CEMETERY

Another surprise awaited us in the Catacomb of Jackals. This hypogeum of jackals was opened by the Egypt Exploration Fund last year and was reopened this year (see page 1051). Although deep underground, the stench was so great when it was first reopened that it was disagreeable at a hundred yards distant. The first man who attempted to enter the cave with me was almost asphyxiated, but we crawled out without harm.

To the writer, three days later, was assigned the odoriferous duty of finding among these tons of decayed or half mummified bodies a number of specimens fit for scientific examination, to settle the question as to the exact relation existing between the ancient and modern jackal and to discuss also whether these beasts thus honored with religious burial were all true jackals or whether wolves and dogs were included, for even yet the ordinary modern Arab dog seems half jackal.

I found these catacombs to be almost worthy of comparison in size with certain famous catacombs of the early Christian period used for human cemeteries, while, so far as the number of burials was concerned, these rooms contained more bodies than were ever put in any other series of catacombs known to man. The central passage of this hypogeum I should estimate as being at least 150 feet long and perhaps 7 to 10 feet wide, and this was piled from end to end with corpses from 3 to 6 feet deep, while the many-sided chambers were packed at least equally full.

A GHASTLY SIGHT

All Egypt must have been searched for the hundreds of thousands of sacred animals which were crowded into this huge tomb dug for them in the holy ground of Abydos. Here were big and little, old and young, originally mummified and bandaged and sometimes with fine decorations wrought in needlework upon the mummy wrappings. But either because this was defectively accomplished because the burial place was not so well chosen as in the case of the ibises, or because of their brief opening to the air last year, these bodies were all partly decayed and the wrappings rotten.

Crawling on hands and knees for four hours over these piles of bodies, one sees many a ghastly sight—thousands of skulls or half-mummified heads; bodies broken and mashed; bones that crumble at a touch; eyes staring wild or hollow sockets filled with black paste; mouths closed just as they had been reverently arranged by the priestly undertaker 2,000 years ago, or sprung wide open as if the creature had sent out a horrible wail in the last moment of its life. The sight of white, sharp teeth glinting everywhere in the light of the candle was indeed weird and gruesome.

That four hours' experience can never be forgotten; shoulders bent, back cramped, down almost with face and nose touching these grinning skulls, feet, hands, and knees crunching into a mass of putrifying bones which often fall to powder as you touch them or cause a cloud of mummy dust to envelop you, filling eyes and mouth and nostrils. Modern dust blown by the Khamsîn is bad enough, but this is dust that no breath of wind has touched for 20 centuries. The eyes are inflamed as if by fever and the respiration is clogged and spasmodic. Let us be careful, too. If this mummification was with bitumen, it only needs a careless movement of the candle, and in a moment your body and those of the sacred beasts will be offered to the gods in a hecatomb of flame!

CARE FOR THE SACRAMENTALLY SLAIN

Think of the time and money and energy, the fear and reverence and per-

haps love, represented by the mummification and clothing of these hundreds of thousands of bodies, more than are contained in any human cemetery on the planet! That the overseer of the work thought of this as a religious task and had expected the very best care to be taken of these holy bones by his subordinates is proved from the fact that even scattered fragments of bodies were gathered up and mummified when the entire body could not be obtained.

That all these sacred beings were killed religiously and with sacrificial awe must be considered practically certain. To the ancient Egyptian to kill a sacred animal was not only murder, but sacrilege, except as it was put to death sacramentally. To care for a sick animal was as much a duty as to care for sick relatives. A hieroglyphic text from the Old Kingdom makes the dead man declare at the judgment: "I gave bread to the hungry, water to the thirsty, and clothing to the naked. I gave food to the ibis, the hawk, and the jackal."

Every preparation had been made to prepare this worthily as a "House of Eternity." The digging of the sepulcher was well done, and in the walls one could see the niches where the lamps of the hierophants must have stood when the bodies were carried into the tomb and the last rites of burial pronounced. What were those rites of burial? No one living can tell. We here touch the most mysterious fact of the old Egyptian religion, as in the ibis cemetery, the reverence for animals as the incarnation of the life of deity.

WHY THE JACKAL WAS SACRED

Why was the jackal so revered and why was his burial place selected in the holy city of Abydos? The answer is exactly the same as in the case of the ibis.

The jackal was sacred to Anubis, who, in the myth of Osiris, was one of the chief deities concerned in winning immortality for the human race. Anubis was the friend of the righteous dead and guided the soul across the trackless desert to the fields of Aalu. According to Egyptian theology, the judgment came immediately after death and was held in the Hall of Maat, where 42 judges listened to the plea of the deceased that he had been sinless, and where the heart of the dead man was weighed in the scales against the ostrich feather—symbol of Maat—goddess of truth.

This weighing was conducted under the eye of Thoth, scribe of the gods, and of Anubis, the "Opener of the Ways," who stands close to the balance ready to start quickly on his journey with the justified dead, while a little further off crouches the monster Ament, "Devourer," waiting for his prey if the decision is adverse.

The reason why the jackal was chosen as symbol or incarnation of Anubis is perfectly plain. On each side Egypt is inclosed by mountains, beyond which lie limitless deserts. Kings may sometimes travel by the sun boat to the next world, but most of human kind must take their route over the Sahara if they ever reach this happy land of the west. The desert was always thought of as the land of Set—rocky, unproductive, hostile, a land of ghosts—dead souls that have lost their way.

A PICTURE OF THE DESERT

One day I climbed to the top of the *gebel* and started out over the Sahara toward the sunset to find out for myself what this region was that was regarded by the ancient Egyptians as the Shadow of Death. Before night I had become satisfied that the Egyptian symbolism could not be improved; dreary, limitless, with no hint of vegetation or life of any kind, no blade of grass, no bird or insect or beast to be seen, with its imitation wadys and deceptive mirages and endless stretches of bare sand curled into wild shapes; it looked like a demon land, and I did not wonder that the authorized version of the Old Testament translates "jackal," the one inhabitant of this realm of death, by "dragon." This is, peculiarly, the animal of the desert.

Practically every soul must pass through this wilderness before it can reach the blessed oasis, the kingdom of Osiris. The jackal's omniscience as to where any dead body is hidden, his wails in the night as if for lost souls, his cer-

Photo from U. S. National Museum

MUMMY—IBIS RELIGIOSA—FROM NATURE

"The intricate interlacing of the black and white bands in geometrical designs recalls Plutarch's description, 'The ibis was thought to bear some relation to the moon, from its feathers being so mixed and blended together, the black with the white, as to form a representation of the moon's gibbosity'" (see page 1043).

Photo from Egypt Exploration Fund

IBIS-HEADED THOTH GIVING LIFE TO SETY I: ABYDOS TEMPLE

"To kill an ibis, as Diodorus tells us, was to commit murder and bring upon one capital punishment. The reason for this is seen in this bird's identification with Thoth, through whose magical wisdom Osiris had been brought back to life. One of the common titles of Thoth was 'He of the nose,' referring to the ibis beak, and he is generally represented on the monuments with an ibis head" (see page 1046).

tainty of direction out in the limitless, trackless, demonic desert, and the fact that though his home is the desert, yet he is never far from an oasis, made this animal the best possible symbol of a guide for the dead.

Blessed even now is the lost traveler on these sands who sees a jackal track! It was only last year that a member of this very camp was lost on the *gebel*, and would have spent the night there had he not, by good fortune, found a jackal track, which guided him to the valley. Says the Book of the Dead: "I am the Jackal of Jackals, I am Shu, and I draw air from the presence of the God of Light to the bounds of Heaven and to the bounds of earth and to the bounds of the uttermost limits of the flight of the Nebeh bird. May air be given unto these young divine beings!"

Not folly, but religious devotion, caused the Egyptians to honor this animal and thus pictorially teach a great truth concerning the mystic journey from death to life and the soul's need of a heavenly guide if it make the journey successfully. Yonder far to the west is Khargah, the longed for oasis, and Anubis is the only possible guide thither and the jackal is his embodiment. Let us give him honor!

THE SPHINX CITY OF THE EARTH

Abydos is the Sphinx city of the earth. Only three other places in Egypt can compare with it in the extent and majesty of its ruins, and no other possesses the deep mystery which glooms the strange and inexplicable constructions. Here was situated the oldest sanctuary known in human history, dedicated to Osiris and almost certainly dating back to the first dynasty.

Here is the largest and oldest necropolis of the world, where for 3,000 years the nobles of Egypt came for burial, and even when unable to find final resting place in this sacred ground, here they would lie in state under the shadow of the temple of the beautiful-faced Osiris and bury here some sacred images and

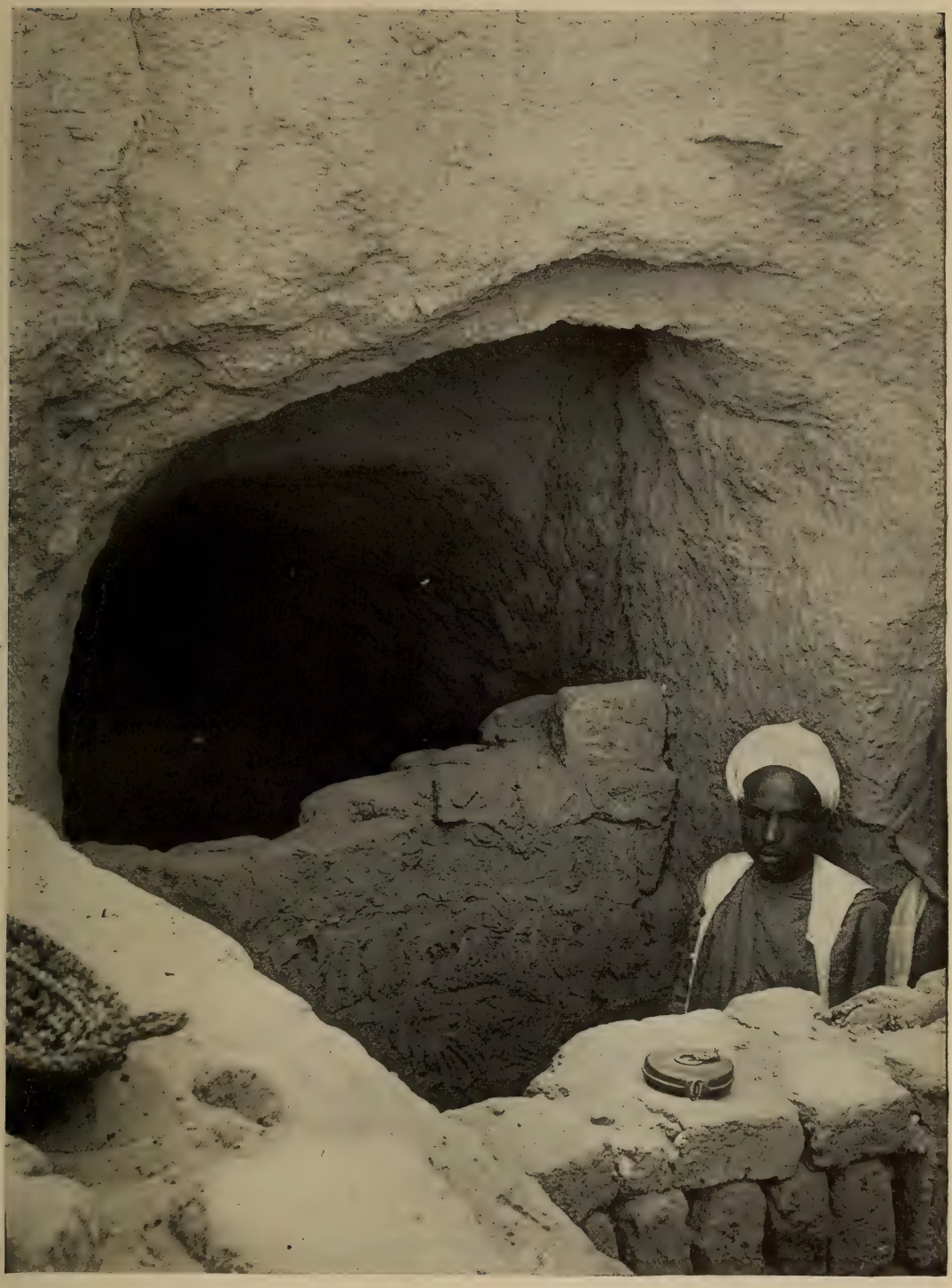


Photo from Egypt Exploration Fund

ENTRANCE TO JACKAL CAVE, WHERE HUNDREDS OF THOUSANDS OF JACKALS WERE BURIED

"Why was the jackal so revered and why was his burial place selected in the holy city of Abydos? The answer is exactly the same as in the case of the ibis. The jackal was sacred to Anubis, who, in the myth of Osiris, was one of the chief deities concerned in winning immortality for the human race. Anubis was the friend of the righteous dead and guided the soul across the trackless desert to the fields of Aalu" (see page 1048).

make acceptable offerings before being carried elsewhere to their tombs.

Here, according to all tradition, Osiris himself miraculously recovered life after his foul murder and mutilation by Set and his 62 fellow-conspirators. Here he was buried, and for thousands of years pilgrims visited this spot, which, long before the days of Moses, had become the Mecca of the entire ancient world. Here the great kings of the first dynasty built their tombs and filled them with fabulous treasures of art and gold, close to the Mountain of the West, which was the entrance into the kingdom of Osiris.

Here was the entrance, by means of a deep shaft, into the underground waters leading to the heavenly Nile of the other world, and here, close to this deep shaft or well, was the National Chapel, or Temple of Kings, dedicated to Osiris, and close to it the celebrated Osireion, with its mysterious inclined passage leading to some unknown sacred goal beneath the National Chapel. The well leading to the underworld was discovered last year by Naville and Peet, under the auspices of the Egypt Exploration Fund.

WHERE WAS THE HOUSE OF GOLD?

The Osireion, with its strange underground hall, is now in process of excavation (see page 1031), and no man living can tell what may be found when the end of that granite-lined tunnel which slopes toward the underworld shall be reached.

As day after day I ask this question, walking around the Osireion and pondering upon its unique construction, the more I am inclined to believe that Naville may be right in supposing that here, within a hundred yards of where I write, there may be found that world-famous "House of Gold," the original sanctuary of the best loved god of Egypt, where, according to the ancient inscription, 104 amulets of gold and precious stones were preserved with other innumerable treasures.

I came here prejudiced against the theory that this was the entrance to an underground tomb or a sanctuary of Osiris. I still agree with those who do not see in the stones so far uncovered any signs of an age preceding the age of Merenptah, and yet I find it more and more impossible to think of this merely as Merenptah's chapel or tomb. What we have already uncovered is undoubtedly a temple built or rebuilt by this Pharaoh—a temple in such state of preservation that it will be protected by the government and will hereafter be shown to tourists as one of the sights of Abydos.

If this subterranean tunnel only leads to a Ka-tomb of this famous Pharaoh of the Exodus, it will be well worth all the effort and expense it will involve to remove the hill and debris in which it is buried. Such tomb would, in such a location, undoubtedly seek to copy the oldest Osireion originals, and would almost certainly lead to most interesting results as regards the religion and the history of that most interesting epoch; but, personally, I am now inclined to hope for the discovery here of the most ancient sanctuary of Osiris.

THE MOST ANCIENT SANCTUARY OF OSIRIS ON THE VERGE OF DISCOVERY

It is certainly not an ordinary royal tomb to which this passage leads. Royal tombs in Egypt were never built under temples, and, besides, Merenptah's royal tomb was, as we know, splendidly built at Thebes, where his grave lay close to those of his illustrious ancestors. If it shall turn out to be the original underground sanctuary of Osiris, or even a subterranean chamber where, in the days of Moses, the mysteries of Osiris were celebrated, and if it shall be found even partially inviolate, then it must mark one of the most important discoveries ever made in its bearings upon the science of comparative religion (see page 1053).

It is hard to overestimate the influence of the Osiris cult upon ancient religions, and Abydos existed solely to exalt that cult. The royal tombs of the first dynasty kings were built on sacred ground and were dedicated to Osiris. The temples of Seti and Rameses would naturally be built over some sacred rite.

No one doubts that the sloping passage of the Osireion, diving into the earth as if in search of the underworld, is in a direct line with the axis of the Seti Temple, which lies above it and about 100 feet to the east, and that it also was

Photo from Egypt Exploration Fund

THE MYSTERIOUS SLOPING PASSAGE IN THE OSIREION

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Photo from Egypt Exploration Fund

POTTERY COFFIN AND DOUBLE BURIAL

This picture shows a striking contrast to the method of burial shown on pages 1038 and 1039. There we see an example of burial from one of the earliest periods of ancient Egyptian history; here we have one from a very late date. The coffin in both cases is of pottery, but the later form is shaped to fit the body and is large enough to contain two mummies. This practice of double burial began about the end of the Ptolemaic period, and examples of it are not common.

Photo from Egypt Exploration Fund

A MASTABA

The Mastaba is an early form of Egyptian tomb, made of brick or stone, with sides sloping inward and the roof flat. Within were three rooms: in the first was a low stone bench on which incense was burnt and offerings made; in the second was placed the *serdab*, or portrait figure of the deceased; behind and below these, and reached by a well-like opening, was the chamber in which the actual mummy was deposited. The name is derived from the Arabic word for the bench, which is a prominent feature in the first chamber.

built in premeditated connection with the royal tombs, lying also above it and perhaps some half mile to the west. No one doubts that both the royal tombs and this vast complex of pillars and chambers, which we now call the National Chapel of Seti and Rameses, were both dedicated to Osiris. The walls of the latter building are decorated with noble portraits of this god and the texts contain constant homage for his cult of the resurrection.

No one doubts that the Osireion itself was built in honor of this god of the future life. On its walls are the very decorations which Horus is recorded as having made in the tomb of his father Osiris, and its inscriptions from the Book of the Dead and Am-Tuat deal almost exclusively with this world of the after-life.

OSIRIS WAS TO ABYDOS WHAT DIANA WAS TO EPHESUS

No one doubts that the relic of Osiris, "The Living One," preserved here and carried in all the great religious processions, was the chief glory of Abydos as truly as the image of Diana was the chief glory of Ephesus. No one doubts that the cult of Osiris Unefer, "The Good Being," dominated Egypt for thousands of years in a way scarcely paralleled elsewhere in all history, for upon Osiris, "King of Amenti," "Ruler of the Underworld," "Lord of Might Smiting the Fiend," rested every hope of immortality which could be cherished by the hundred million Egyptians who died during the dynastic period.

No wonder the Egyptians loved him and buried the sacred sites at Abydos under tens of thousands of votive offerings and produced here millennium after millennium the first great Miracle Play of History, which presented in dramatic and realistic form the story of the death and revivification of this "Golden One of Millions of Years."

No one doubts that somewhere in connection with the temple or tombs of Abydos was celebrated, presumably underground, the "Mysteries of Osiris," famous throughout the entire ancient world, by which kings and nobles were so powerfully affected that the grave lost its horror and they could look without fear toward the setting sun of life.

No wonder that one dreams dreams and sees visions, sitting in the dusk close to the Osireion, with the mementos of the mighty dead all about one, and the hope of a future life written big in every text inscribed on every wall built upon these sands.

NOTE.—Through inadvertence on the part of the writer of the article in the March number of the NATIONAL GEOGRAPHIC MAGAZINE, entitled "Excavations at Quirigua, Guatemala," no mention was made of the financial support which rendered this work possible. The paragraph should have appeared as follows:

"During the months of February, March, and April the St. Louis Archeological Society and the United Fruit Company maintained in the field at Quirigua, Guatemala, an archeological expedition, the work being under the direction of the School of American Archeology."

It is a matter of regret to all who have been connected with the work, and especially to the writer of the article, that no mention of it should have been made in the article of the NATIONAL GEOGRAPHIC MAGAZINE. Therefore it is hoped that this note will remedy the oversight.

VOL. XXIV, NO. 10 WASHINGTON OCTOBER, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

RUMANIA AND HER AMBITIONS

By Frederick Moore

Author of "The Balkan Trail"

SINCE the days of the Russo-Turkish war of 1877, when the Rumanians crossed the Danube and aided the Russians in driving the Turks out of the province of Bulgaria, there has been peace, but not much good feeling, between the Rumanians and the Bulgarians. The lack of sympathy between the two has culminated in recent years in a close association on the part of Rumania with the Germanic Alliance, and in the last few months in a successful war for an adjustment of frontiers.

In an article on the Balkan War, published in a recent number of the National Geographic Magazine,* I mentioned that the claim of Rumania was based on the fact that the other Balkan States annexed by their conquests a number of settlements of Vlachs (sometimes called Kutso-Vlachs), who are remnants, like the Rumanians, of ancient Roman invasions of the Balkan Peninsula.

It is my plan in this article to expand that explanation and to show also why the Balkan Question is not the simple matter of Mohammedan domination in certain Christian provinces invaded and subjected by the Turks five or six centuries ago.

It was natural for the Rumanians to contract the fever of territorial acquisition which affected all the other Christian countries of the Balkans in recent years. The departure of the Turks from Europe was recognized as a certainty for many years, and Greece, Bulgaria, and Servia were laying claim to sections of Turkish territory according to their own censuses, respectively, of Greeks, Bulgarians, and Servians populating Turkey.

There was bitter rivalry among these states, so bitter that the stay of the Turks in Europe was delayed for a number of years. Into this conflict Rumania saw her opportunity to enter and assume a sort of protectorate over the scattered settlements of Vlachs or Wallachs (apparently a Slav name for Italian).

THE DREAMS OF THE BALKAN POWERS

This claim was somewhat far-fetched, but the fever of acquisition ran high and was infectious, though the Rumanian pretensions were not out of keeping with those of the other states. The Greeks, for instance, aspired to re-create the Byzantine Empire, while the Bulgarians and the Serbs looked to the re-establishment of the kingdoms respectively of their greatest ancient czars.

Only a year ago were the Slav States and Greece able to sink their differences and come to a decision about the division of Turkey in Europe, whereafter the attack on Turkey soon followed. But Rumania had too little to gain and too much to risk. She was not in a mood to enter a Balkan alliance, and the other states

* February, 1913.

Photo by Frederick Moore

THE SACRED WOLF OF ROME IN BUCHAREST

The Rumanians are intensely proud of their descent from the ancient Romans and take every opportunity of emphasizing it. Here in the streets of Bucharest is a bronze statue depicting a scene familiar to every student of Roman history. It shows the twin brothers, Romulus and Rhemus—the legendary founders of Rome—being suckled by the wolf. The two infants—so runs the legend—were sons of the god Mars by Rhea Silvia, daughter of the king of Alba Longa. They were placed in a basket by their grand-uncle and sent adrift in the River Tiber. Cast up on what was afterwards the site of Rome, they were suckled by a she-wolf and fed by a woodpecker until rescued by the shepherd Faustulus, who became their foster father.

Photo by Frederick Moore

RUMANIAN VETERANS

These are peasant soldiers who took part in the Russo-Turkish war of 1877, wearing the medals won at Plevna, where the Rumanian soldiers under Prince Charles, the present king, greatly assisted the Russian forces and covered themselves with glory by the assault and capture of the Grivitza redoubt.

understood her temper and attitude and did not invite her. Furthermore, Bulgaria, especially, did not want her to participate, for Rumania had no frontier contiguous to Turkey, and if she was to receive territorial compensation for the Vlach population over which she had spread her wing it must be at the expense of Bulgaria.

Rumania's claim on Bulgaria was made as soon as the armistice was signed at Tchatalja, early in December last. It

Photo by Frederick Moore

RUMANIAN INFANTRY ON PARADE

The army of Rumania has for many years been maintained in a high state of efficiency. On a peace footing it consists of five army corps, and its normal strength is about 5,000 officers and 100,000 non-commissioned officers and men. The soldiers here shown are in their winter uniforms—black greatcoats and black caps, set off by a dark green feather.

Photo by Frederick Moore

A GROUP OF CADETS AT THE INFANTRY SCHOOL

This picture shows one of the curious features of life in the Balkans. In the center is one of the Mohammedan subjects of King Charles. He enters the military service of the country just as do his Christian neighbors, but he preserves the characteristic fez even in his uniform.

Photo by Frederick Moore

AT PRACTICE WITH THE GUNS

When King Charles first went to Rumania he found the army consisting of raw levies, with no uniforms and in some cases armed only with sabers and pikes. Educated under the famous German general, Moltke, and having served with distinction in the Danish war of 1864, King Charles possessed just the equipment to raise the army of his adopted country to a thoroughly efficient standard, and today, as the result of his efforts, the Rumanian army compares favorably with any in Europe.

Photo by Frederick Moore

YOUNG RUMANIAN OFFICERS

In this group the young officers look as smart and soldierly as one could wish, and quite worthy of their fathers, who fought so valiantly at Plevna

Photo by Frederick Moore

RIVER BOAT BENEATH THE CLIFFS OF THE DANUBE

"The country is far in advance of other Balkan countries. Fast express trains run daily the length and breadth of the state; ports on the Danube collect and ship the produce of the country to various parts of the world; a fast Rumanian steamship line carries European mails from Constanza, on the Black Sea, to Constantinople and other eastern centers of commerce" (see text, page 1079).

looked to the outside world (as a notable London *Punch* cartoon represented the situation) as though Rumania were acting the part of highwayman in attempting to rob Bulgaria, while the latter, employing her forces against Turkey in the south, was defenseless on her northern frontier.

But the fact cannot be disputed that the claim of Rumania had been known and understood for years.

HOW RUMANIA GAINED ITS NEW PROVINCE

At the renewal of hostilities between the Turks and the Allies a member of the Rumanian government, in conversation with a Bulgarian statesman in high authority, proposed to join the alliance of the Balkan States and to set the Rumanian army also in motion against the Turks. But the offer came too late. The Bulgarians then knew their strength, both in the field and in European politics, and they had no desire to let the Rumanians cross the frontiers, knowing that too many of their military men would like to remain there.

The statesmen in authority in Rumania, having by that time decided to accept any adjustment of territory that could be obtained peacefully, agreed to accept the offices of Russia as intermediary. The Bulgarians likewise agreed, and there the matter stood until Bulgaria fell out with her former allies—Servia and Greece. Rumania thereupon joined the latter, and by a brief war, which cost her but little in blood or money, obtained the fertile province of Silistria.

Now, why has there been no friendship

Photo by Frederick Moore

THE IRON GATE OF THE DANUBE

Most people think of the famous Iron Gate as a narrow and gloomy defile where the waters of the river are hemmed in by stupendous cliffs. In reality the Iron Gate is a fairly wide portion of the river, but guarded by rocks, which at high water are entirely hidden from sight. Through these dangerous rocks a deep, wide channel has now been blasted, and a jetty formed from the stone thus obtained is shown in the picture.

between these two Balkan States whose peasants fought side by side in a terrible struggle against the Turks only 35 years ago? It is an interesting history.

Like most of the other Balkan peoples, the Rumanians are the descendants of one of the great pre-Turkish invasions of southeastern Europe. They are the children of those Romans who conquered the ancient Dacians, intermarried with them, and gave them the Latin language, which has continued, with few variations, to this day.

When the Roman Empire began to shrink and other invasions swept over these outpost provinces of Rome, this Daco-Roman race took refuge in the mountains and maintained their distinctive characteristics and language in the same way that several other Balkan peoples also succeeded in doing. When the invasions had passed through the country they again descended to the plains more or less an intact race.

The final successful invasion of the Balkan Peninsula, that of the Turks—whose desire was to conquer Europe for Mohammed—came at a time when these people were beginning to develop ideas of nationality. Their local governments were medieval and primitive, and they seem to have been quite as barbarous as the Turks. The Turks, indeed, were greatly superior to them in several ways, especially in military organization, and therefore succeeded in obtaining domination over them.

THE SUBTLE GREEK HOSPODARS

Soon after the Turkish conquest the Greeks, though always boastful as a race of revenging themselves upon the Turks, were yet willing, personally, to make themselves rich by conducting the civil

Photo by Frederick Moore

LEARNING THE ART OF WAR

Here is a group of young Rumanian officers learning how to sight for artillery fire in the grounds of the very up-to-date Artillery Academy. The Rumanian army is equipped with the latest Krupp quick-firing guns, both in the horse and field artillery.

Photo by Frederick Moore

PEASANTS AT THE FAIR

One of the pleasantest experiences of a tourist in Rumania is a visit to a country fair. The peasants delight in music and dancing and enter into the fun with the greatest zest, while their picturesque costumes add charm to the scene. Note the soldier regarding the amusement booths with rapt anticipation.

Photo by Frederick Moore

PEASANT MOTHERS, OLD AND YOUNG

The peasants marry very early in Rumania, and the ceremonies accompanying a country wedding still preserve the tradition of marriage by capture. In some districts a flower is painted on the walls of the cottage which is the home of a girl of marriageable age. Note how curiously the babies are bundled.

affairs of state for their conquerors, the Turks being indifferent and incapable administrators. The Greeks obtained many of the civil offices in which profits were to be made, and early in the 18th century, by one of the many strange systems adopted by the Turks, they were appointed princes (called *hospodars*) of the trans-Danubian provinces of Moldavia and Wallachia, which now form the kingdom of Rumania.

These *hospodars* obtained their places by purchase from the Sultan. Enormous sums had to be paid for the posts, and the Greeks who bought them and became princes for a time had to recover their outlay quickly, for they could hardly get to Jassy and Bucharest before the palaces of those respective capitals were again put up for sale to other Greeks in Constantinople. In the pressure put by the *hospodars* on the people of Moldavia and Wallachia the first seeds of Rumanian dislike of the Greeks were planted.

In the early part of the 18th century the pressure of Russia, the Colossus of the North, began to be felt seriously throughout Europe and especially in the Balkan Peninsula. That pressure has never ceased to exist, although it has always been held back successfully by the other European powers.

In order to be rid of the Turkish domination, the provinces that were later to unite under the Rumanian flag accepted the protection and military assistance of the Russian czars. On many occasions, indeed, they sought it—in the name of the cross—for Holy Russia was of their own Christian faith, that of the (Greek) Orthodox Church.

Nine times in all the armies of Russia traversed Moldavia and Wallachia in marches against the Turks, and almost or

Photo by Frederick Moore

FRUIT SELLERS AT A STREET CORNER: BUCHAREST

Great quantities of fruit are grown in Rumania. Apples, pears, medlars, cherries, peaches, apricots, and melons are very plentiful, but the greatest attention is bestowed upon the damson, from which a mild spirit, called *tsuica,* is distilled.

quite as many times were the Rumanians—and other Balkan races—saved from Russian domination by the interference of other European powers, sometimes by recourse to arms.

HOW RUSSIAN DOMINATION IN THE BALKANS WAS PREVENTED

In the wars of the czars against the sultans, England—whose policy has always been to oppose the extension of power of the dominating nation of the Continent—took the part of Austria-Hungary. Austria-Hungary could not allow, with safety, the extension of Russian power to her east and south; and England, rightly jealous of her command of the seas, was no more willing that the great Slav State should extend from the Baltic to the Ægean Sea than she would be today to let the Germanic combination of powers similarly cross the Continent.

It was at first the plan of England, under the leadership of Disraeli, to make buffers of the Balkan States between Russia and Constantinople; and now, apparently, it is her desire, as the result of the triple *entente*—the menace of Russia having given place to that of Austria-Hungary supported by Germany—that the buffers shall serve to block any Germanic extension to the east.

In defiance of the will of the Sultan and the powers, Moldavia and Wallachia united in the year 1859 and chose the name of Rumania for their new state. There were fears in Europe—as there were fears in the case of Bulgaria later—that Rumania would become a vassal of Russia and an outpost for her in her march toward the Bosporus and the Dardanelles. But the defiance of Rumania was permitted to pass unopposed.

WHAT CAME OF DEFYING THE POWERS

In 1866 a foreign prince was elected, native princes having proven failures, for one reason, because there were always too many rival pretenders. The choice fell upon Prince Charles of Ho-

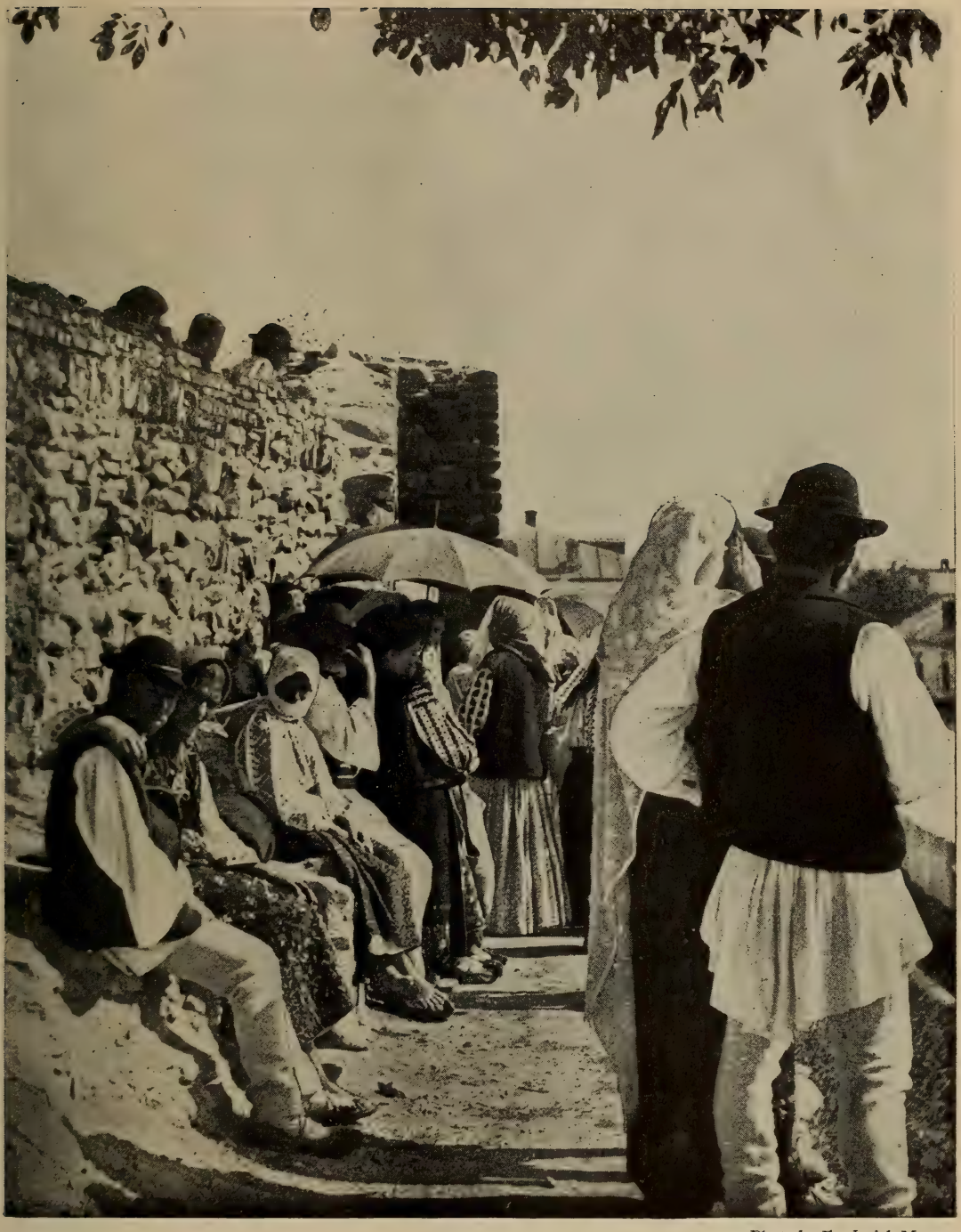


Photo by Frederick Moore

PEASANTS ON A HOLIDAY

Few peasants cling so tenaciously to their national costume as do those of Rumania. White is the prevailing note, for the men wear loose white trousers and long linen blouses, belted at the waist, and the women's skirts are often white, too, but generally gay with embroidery. On holidays both sexes wear short sleeveless jackets of every color of the rainbow, bedecked with gold lace and a wealth of needlework.

Photo by Frederick Moore

WAITING FOR CUSTOM

Waiting on the steps of the market and in many other convenient spots in Bucharest are the *hamale,* or carriers, who wait to carry home the purchases of their wealthier fellow-townsmen. As in all countries, poverty exists in Rumania; but, taken as a whole, the country is remarkably prosperous.

Photo by Frederick Moore

COUNTRY TEAMSTERS IN TOWN

Bucharest has a great transit trade, especially in timber, grain, and vegetables, and consequently teamsters from the surrounding country districts are a common sight in town. While not so picturesque as the peasant, the teamster, in his gray coat embroidered in black, and his blue clothes, adds a touch of color to the crowds of the city.

Photo by Frederick Moore

GYPSY FLOWER GIRLS

The gypsies are very numerous in Rumania, and, like most of their brethren the world over, they are none too fond of work. Consequently they are seldom found in any of the steady manual occupations, as they prefer to be flower-sellers, musicians, peddlers, or to follow any employment which permits them to cling to their traditional vagabond existence.

henzollern-Sigmaringen. The Conference of Paris declared Prince Charles' election void; but, acting boldly on the instigation of Bismarck, this young man of 27 went straight to Bucharest, where he has since ruled with distinguished wisdom, satisfying the very powers that opposed him.

It will be seen that defiance of the so-called Concert of Europe, so strikingly evident in the past 12 months, has precedents in Balkan history.

Prince Charles had received a military training in Germany, and he brought to his adopted country German ideas of discipline and government. In a very few years Rumania bore evidences of his capable influence. Prince Charles obtained from his suzerain, the Sultan—"blissfully unconscious of the use to which they would be put"—permission to organize a militia of 30,000 men.

By one of those several reform movements such as have been seen in Turkey in more recent years, a constitution was proclaimed in Constantinople in 1876, the famous constitution of Midhat Pasha. This constitution—the prototype of that of 1908, which brought similar disasters in its trail—proclaimed the indivisibility and unity of the empire, including the privileged provinces. Indignation at Bucharest was intense, for under the rule of Prince Charles the Rumanians had come to consider the suzerainty of the Sultan a matter of mere form. This was a moment for them to achieve full independence and here was excuse for proclaiming it.

RUMANIA'S PART IN THE WAR OF 1877

To make the issue doubly sure, Rumania signed a secret convention with Russia in April, 1877, permitting the armies of the Czar to cross their country again in order to drive the Turks out of

Photo by Frederick Moore

GYPSY STREET MUSICIANS

These gypsies probably learned to play the trumpet during their term of service in the Rumanian army, and now continue playing as a means of livelihood, performing in the streets of the city and at country dances.

Photo by Frederick Moore

GROUP OF GYPSY SHOEMAKERS

The *tzigane,* or gypsies, are a distinct race and speak a language of their own. Mostly converts to the Orthodox Church, they are now beginning to mingle freely with the Rumanians, though until about 1850 they were divided among themselves by caste distinctions and some could be bought and sold like slaves.

Photo by Frederick Moore

A WARM DRINK ON A COLD DAY

Here is an open-air café, such as are not infrequently seen in the streets of Bucharest in winter, and the vender is selling a native warm drink. The Rumanians are a sober people and use the wine of their country very sparingly.

the Bulgarian provinces, where the rebellion and massacres of the previous year had given Russia cause again to interfere in behalf of the Christian subjects of the Sultan.

The Rumanians declared war on their overlord, and offered their army to assist the Czar; but the confident Russians, who had subsequently to mobilize twice the number of troops with which they began the war, declined the assistance of the Rumanians, until after Osman Pasha had repulsed their charges repeatedly, with terrible Russian losses.

Then the Czar sent an appeal, which came to be historic, asking Prince Charles to cross the Danube where he could and come to the aid of the Christian cause. The humbled Russians were willing then to give the prince of Rumania, who marched with his army, command of the combined forces besieging Plevna.

Prince Charles put his newly-trained troops in front of the famous Gravitza redoubt, the most powerful fortress of the Turks; and, when the next assault came, they took it, and, what is more, held it against repeated counter attacks till the city finally fell.

But, as I have said, the friendship of Russia and Rumania did not survive the war. The Rumanians had been for more than a century tampering with fire in dealing with Russia. They should have foreseen, if they did not, that Russia would exact some territorial compensation for this war.

Where was she to get the reward of victory? She was then in the same position that Rumania is now—she had no frontier in Europe contiguous to Turkey.

Photo by Frederick Moore

IN HIS BEST COAT

When in all the glory of his best clothes, the Rumanian peasant is a delight to the eye, and most gorgeous of all his garments is his great coat. The countryman in the picture is wearing a coat of vivid crimson, plentifully embroidered with yellow and gold thread.

Photo by Frederick Moore

TWO JEWS OF JASSY

"The Jews are probably the most unhappy people in Rumania. The Jews live especially in the province of Moldavia. Great numbers of them have taken refuge there from persecution in neighboring Russian provinces. Though they are free, with rare exceptions, from excessive outbreaks such as have taken place in Russia, they enjoy no political rights in Rumania, nor are they, or any other alien, permitted to purchase or own land outside the cities" (see text, page 1080).

Photo by Frederick Moore

IN THE MARKET-PLACE OF JASSY

Jassy is the capital of Moldavia, a pleasant little city lying among vineyards and gardens. It is the center of a rich agricultural district, and the peasants of the surrounding countryside flock to its market, and, by their picturesque costumes, make it an animated and brilliant scene. Those in the picture seem to be a little afraid of the camera.

Could Russia be expected scrupulously to regard Rumania's integrity?

Had Russia succeeded in dominating the "Big Bulgaria," which she created by the treaty of San Stefano, there is little doubt that she would also have kept the road open for her armies to and from that state across Rumania; but the other powers of Europe again interfered; Russia was threatened with a greater war than she had just concluded, and rather than enter upon it, she consented to a European conference on the question of Balkan frontiers.

The powers feared that the Bulgarians, being Slavs like the Russians, would become but an outlying dependency of the Czar's dominions. The famous Berlin Conference was the outcome.

For many reasons the Rumanians had cause to be thankful. They had made their place in Europe by proving themselves willing to die for the cause of liberty and by showing that they understood the art of modern warfare.

RUSSIA TRICKS RUMANIA

The Russo-Turkish war, like the present one, had had its surprises for the wise heads of Europe. The Rumanians were able to throw off forever those ill-defined ties which were "known at Constantinople as suzerainty and at Bucharest as vassalage."

But they had also to suffer a bitter disappointment—the loss of that portion of Bessarabia which they held previous to the war. In the treaty of peace with Turkey, Russia obtained from the Sultan a section of what is known as the Dobrudja, a territory bounded on two sides by the Danube (because of a great bend

Photo by Frederick Moore

GROUP OF RUMANIAN BOYS

In Rumania boys often swear eternal brotherhood, and the church sets its seal on their choice at a service during which their feet are chained together. This kinship is as binding, both morally and legally, as that of blood. Girls in a similar manner adopt sisters of their choice.

Photo by Frederick Moore

A RUMANIAN DARBY AND JOAN

The Rumanian farmer is a most attractive person and an interesting study as well. Intensely proud and patriotic, he is as frugal as he is industrious. For the greater part of the year he lives on *mamaliga*—a maize porridge—and vegetables. He rarely touches meat, and in some districts pork is eaten only on December 20—St. Hilary's Day. The couple in the picture are highlanders, as can be seen from the man's round hat, the lowlanders preferring the high conical cap of lambs' wool or felt.

Photo by Frederick Moore

A REMINDER OF THE PAST

Along the shores of the Danube can be seen the remains of old Turkish fortresses, like the one shown in the picture, which stands on the Bulgarian shore, opposite Rumania

in that river), on a third by the Black Sea, and on the fourth by what subsequently became Bulgaria.

The object of this acquisition on Russia's part was to exchange the Dobrudja for the coveted portion of Bessarabia, thereby extending her boundaries south to the Danube. To the Rumanians the exchange was undesirable, for Bessarabia might be called ethnically a Rumanian province, while the Dobrudja, though somewhat larger than the territory surrendered, was peopled mainly by Bulgarians and Turks, racial elements not very easy for a Latin people to assimilate. Furthermore, when the question of the Dobrudja frontier came to be settled, the Russian commissioner proved himself more friendly to the new Slav State of Bulgaria than to the erstwhile ally of his country.

Since the conclusion of the Berlin treaty little has been heard of Rumania until her recent brief war against Bulgaria. The reason is that she has been developing only on peaceful lines and making no "history." So little has Rumania been a danger to the peace of Europe that European newspapers have neglected the city of Bucharest, although, in contrast, they have kept correspondents permanently in Sofia, the little capital of Bulgaria.

Bulgaria has always been a menace since the war of 1877, by which she was created. She has been constantly preparing, from time to time mobilizing, and always intriguing for the day which has come at last, the day for defeating the Turks. On the other hand, Rumanian hostilities to the Turks distinctly subsided after the conclusion of the Berlin Conference, in which Russia showed so definitely that the Bulgarians were her favorites.

UNION OF BULGARIA WITH RUMANIA PROPOSED

It is interesting and important to note that Russia's favor for Bulgaria lasted less than ten years. In that brief space of time the Bulgarians had let the Russians understand very definitely that while they were grateful for their deliverance they had no intention or desire to exchange the rule of the Sultan for that of the Czar.

They declined the dictation of Russian agents, and acted contrary to Russia's policy to such an extent that the Czar withdrew his diplomatic agents and his military advisers and instructors, and for

Photo by Frederick Moore

THE ATHENEUM: BUCHAREST

This building, used as an art gallery and museum and occasionally for literary conferences and concerts, is regarded as one of the best examples of modern Rumanian architecture.

Photo by Frederick Moore

THE GOVERNMENT SAVINGS BANK: BUCHAREST

"Bucharest is generally a surprise to visitors from other countries. Few expect to find anywhere in the Balkans a capital that can worthily be called a 'little Paris,' yet Bucharest is worthy of this title. It is a city with broad, clean streets, on which are to be found good stores and splendid public buildings; and there are avenues of beautiful homes, in which the distinctive architecture of the country is displayed with remarkable effect" (see text, page 1079).

Photo by Frederick Moore

THE NATIONAL FLAG AND ITS ESCORT

Here we see the Rumanian colors, belonging to one of the regiments, with its escort of five men and in charge of an officer

a number of years diplomatic intercourse between Sofia and St. Petersburg ceased to exist.

During this period (the first Prince of Bulgaria, Prince Alexander, having abdicated because of his difficulties with Russia) the Bulgarians appealed to Prince Charles, who had now become king of independent Rumania, to become also Prince of Bulgaria. Had the king accepted, a union of Bulgaria and Rumania would have been effected; but King Charles feared to oppose the government of Russia, then in a surly temper because of the growing independent spirit of the Balkan States. King Charles declined the offer. But the present Czar of Bulgaria, then Prince Ferdinand of Saxe-Coburg-Gotha, went to Sofia as Prince Charles had gone to Bucharest, in defiance of certain Powers.

WHY THE RUMAN DOES NOT LOVE THE BULGAR

To return to the account of Rumania's hostility to the Bulgars. There was no more territory for her to conquer from the Turks. She considered that it would do Rumania no good, and yet would aggrandize Bulgaria and make the latter (instead of Rumania) the foremost Balkan State if the Bulgarians should succeed in bringing about a successful war against the Turks.

Rumania's resentment toward Russia and jealousy of Bulgaria went so far, indeed, as to assume the form of friendliness to their enemy. At one time reports were current of an alliance between Rumania and the Sublime Porte, and such an alliance might even have been consummated had the Rumanian government, and especially King Charles, not

Photo by Frederick Moore

ON A BUCHAREST BOULEVARD

Next to the fine Renaissance building, which contains the general post-office, stands a characteristic little Rumanian church. The Orthodox (Greek) churches are almost all small and built in the traditional Byzantine style, with very narrow windows and surmounted by a dome or central tower, with four attendant turrets.

recognized the feeble political position of the Ottoman Empire.

Rumanians, whose argument was different prior to their emancipation, would contend in recent years that the Turk was a good ruler, and that it would not be well for civilization if his possessions in Europe should be further curtailed. It is true that the Bulgarians are a vigorous people and undoubtedly a potentially dangerous neighbor, who might, as the Rumanians fear, attempt at some future date to unite all Bulgars by taking the Dobrudja from Rumania. But there seems to have been no sufficient, tangible reason for the Rumanians permitting their hostility to develop before it was really due. Such, however, is the way antipathies come to exist between nations in this day.

After the Russo-Turkish war the Rumanians seem to have realized suddenly the grave dangers they had run by giving Russia the privilege of marching through their country. Seriously conscious, then, of their grave geographical position, they began to prepare their defenses, so that they should be formidable allies, at least, of the powers hostile to the Slavs.

THE WONDERFUL PROGRESS OF RUMANIA

Universal military service was instituted, frontier defenses constructed, and a network of railways laid down with strategical as well as economical design. It is significant that but one line of railway forms a junction with Russia, though roads to Hungary are connected wherever commerce warrants. The nucleus of a navy has been established also on the Danube and the Black Sea.

Photo by Frederick Moore

OLD AND NEW IN BUCHAREST

Standing among the tall modern buildings of "the little Paris" is this gem of old Rumanian art. The exterior of this church is embellished with frescoes of the saints set amid beautiful arabesque work in the most vivid colors. The cloister at the side, in harmony with the church, exhibits the characteristic arch of the native architecture.

Whether there is a secret treaty between Rumania and the Triple Alliance of Germany, Austria-Hungary, and Italy is not known, but at any rate Rumania is recognized as a silent partner of the two Germanic powers that border Russia.

The Rumanians consider themselves a much superior people to their neighbors. Prior to the present war they did not like to be called a Balkan people, and it would seem that even now, in spite of the prowess displayed by the other Balkan States, they are still reluctant to be classified with them.

It is true that their country is far in advance of other Balkan countries. Fast express trains run daily the length and breadth of the state; ports on the Danube collect and ship the produce of the country to various parts of the world (see page 1062); a fast Rumanian steamship line carries European mails from Constanza, on the Black Sea, to Constantinople and other eastern centers of commerce, and several cities, both in size and style, resemble more closely the cities of Europe than the other Balkan capitals.

Bucharest is generally a surprise to visitors from other countries. Few expect to find anywhere in the Balkans a capital that can worthily be called a "little Paris," yet Bucharest is worthy of this title.

It is a city with broad clean streets, on which are to be found good stores and splendid public buildings; and there are avenues of beautiful homes, in which the distinctive architecture of the country is displayed with remarkable effect (see page 1076). The peculiar architecture of

Photo by Frederick Moore

A COACHMAN OF BUCHAREST

Many of the coachmen of Bucharest are immigrants from Russia and wear the characteristic Russian costume of their trade, as shown in the picture. Most of them belong to a peculiar Russian secret sect and are called the *Skoptsi*, or, in Rumania, the *Lipovans*. Their idea of attaining salvation is through a curious and repulsive form of asceticism.

Rumania will compare favorably with that of any other European state. There are also boulevards in Bucharest, boulevards in the sense which that term implies in Paris.

Political ideals are much the same here as in other Balkan States. Political parties take their turns in office, and to a certain extent indulge in a recognized limit of peculations. As a result taxes are very high. And yet the peasants of Rumania, who supply the wealth for the politicians, are contented and apparently wealthier than the Slav peasants of either Bulgaria or Servia.

THE MOST PROSPEROUS STATE IN THE BALKANS

Rumania is distinctly a more productive and richer country than her neighbors across the Danube. Prosperity is evident everywhere in Rumania, while poverty is not hard to find in Servia, Bulgaria, or Montenegro.

The Jews are probably the most unhappy people in Rumania. The Jews live especially in the province of Moldavia. Great numbers of them have taken refuge there from persecution in neighboring Russian provinces.

Though they are free, with rare exceptions, from excessive outbreaks such as have taken place in Russia, they enjoy no political rights in Rumania, nor are they, or any other alien, permitted to purchase or own land outside the cities (see page 1072).

In many respects Rumania, though a more up-to-date country, is not so liberal as Bulgaria. There are not so many Jews in Bulgaria, and perhaps if their presence was equally marked the Bul-

Photo by Frederick Moore

THE PALACE AT SINAIA

Sinaia is a delightful little village scattered through the pine woods of the Carpathian Mountains. It is the favorite summer resort of the Rumanian aristocracy, and contains the palace or castle of Pelesh, the king's country residence. In addition to its sylvan charms, its mineral springs and baths and the famous Cantacuzene monastery are added attractions.

garians might likewise treat them as aliens. Nevertheless, the Bulgarians have shown themselves more liberal also toward other people and in other ways.

For instance, though the Rumanians are distinctly not church-goers, they will permit no missionaries from other countries to teach Protestant Christianity there. On the other hand, the Bulgarians are devoutly Orthodox (likewise of the Greek Church), and yet to American missionaries and teachers they owe, to a large extent, the knowledge of English which can be found scattered throughout their country.

AMERICAN INFLUENCE IN THE BALKANS

It is said throughout the Balkans that Robert College, on the shores of the Bosporus, is largely responsible for the ideas of independence for which the Bulgarians have shown themselves willing to fight as neither Europe nor the Turks expected them to do. The Bulgarians have been the most willing of the Balkan peoples to accept from the teachers of Robert College the best of American ideals. The Turks have not extensively availed themselves of the opportunity this institution offers, and the Greeks have in greater numbers preferred to learn the lessons which come to those who are traders and shoeblacks in American cities.

While the Rumanians cannot be called liberal in their laws concerning aliens, they cannot be accused of being unpatriotic. Even their politicians have shown themselves generally to be made of the stuff of true patriots.

In recent years, when the Standard Oil Company sought to get control of the rich Rumanian petroleum fields, the government showed themselves alert in the

Photo by Frederick Moore

CROSSING THE FORD

An old Rumanian country priest and his daughter on the way home from market. As in other branches of the Orthodox Church, the parochial clergy of Rumania are all married. The higher clergy, however, including the bishops, are chosen from the monks.

interests of the country. Only after such safeguards had been placed round the American company that they could not cease to work the wells and thereby stifle Rumanian enterprise was the Standard Oil Company permitted to purchase oil lands. In a few years Rumania has profited largely by an expenditure of American capital.

A few facts about Rumania in general, apart from its political problems, still remain to be given.

WHAT THE KINGDOM IS LIKE

The country is shaped like a boot; indeed, the recent acquisition of the province of Silistria has added considerably to this resemblance, for while a distinct heel was formerly lacking, the addition of the new territory makes the likeness

almost perfect. Moldavia, stretching north between Hungary and Russia, forms the leg, a little narrow indeed, but still a leg, while the Transylvanian Alps on the northwestern border, where Wallachia adjoins Hungary, form the instep and continue down to the Iron Gates of the Danube at the toe. The great river, from this point eastward, forms the sole, and the two provinces of Dobrudja and Silistria make a well defined heel.

Speaking generally, Rumania is a great plain sloping upward from the Black Sea in a northwesterly direction, gradually attaining greater and greater elevations until it merges into the mountains of the border. It is the rich, black soil of this plain which has given to Rumania its rank among the great grain-growing countries of the world. Wheat, barley, oats, and maize are grown in great quantities and form the country's chief exports.

In the foothills of the mountains are mile after mile of vineyards, producing excellent wine, most of which, however, is consumed in the country, although this little kingdom ranks fifth among the European wine producers.

Higher up in the mountains are forests, aggregating in all over 7 million acres, now conservated with the greatest care, for the king is an enthusiastic forester, and the timber exported from them produces no small revenue. Oak, beech, walnut, maple, and pine are the chief woods grown.

The petroleum beds are a great national asset, particularly as the Rumanians claim that their product has a higher percentage of the pure oil than is found in the American or Russian wells. The petroleum industry is carried on by private companies as well as by the state, and the Standard Oil Company, as I have mentioned, is also interested. This industry has now been developed to such an extent that Rumania stands fifth on the list of the petroleum producing countries of the world. There are extensive coal fields, both of anthracite and lignite, the largest anthracite fields being worked by an English company, which is also interested in railway development.

The great plains afford admirable pasture land, where great quantities of sheep, cattle, and swine are raised, enabling the Rumanian farmers to enter successfully the meat markets of Germany, Austria, and Belgium.

Vegetables are grown to such an extent that they form the fourth most important item among Rumania's exports.

The fisheries in the Black Sea and the Danube are of great value, particularly the sturgeon catch, from which much caviar is dispatched to Berlin, which is the center of the caviar-distributing industry. The choicer and most delicate fishes are exported to Austria and Hungary in such quantities that Rumania is compelled to import coarse fish from Russia to satisfy her own domestic demand.

WHERE THE UNITED STATES MAKES NO FIGURE

Rumania's greatest export trade is with Belgium and Hungary, while she obtains the greater part of her imports from Germany, Austria-Hungary ranking second, with Great Britain third; and it is distressing to observe that the United States is hardly represented at all.

The kingdom is a constitutional monarchy having a parliament of two houses. The Senate consists of 120 members, elected for eight years, including, *ex officio,* the Crown Prince, the bishops, and representatives of the universities. The Chamber of Deputies has 183 members, who are elected for four years. The voters are divided into three colleges based upon property qualifications, the first two of which vote directly, while in the third those who can read and write and have an income of $60 from rural land also vote directly; the rest vote indirectly, each 50 indirect electors choosing a delegate who votes with the direct electors of the third college.

The total population of the country is, roughly, a little over 7 millions. Included in this figure are the Jews, who, though not Rumanian citizens, form about 4½ per cent of the total population, a larger ratio than in any other country in the world.

Photo by Frederick Moore

A RUMANIAN PEASANT BEAUTY

The country is noted for pretty girls, and there can be few who are prettier than this country maiden in her picturesque national costume of white with its embroidery of red and the bright blue head dress and green apron. The quaint wooden pails are of white wood with burnt-in decorations.

The great majority of the inhabitants belong to the (Greek) Orthodox Church, the number of Catholics and Protestants being negligible. There is a small Mohammedan population, and the Armenian National Church is also represented.

A HIGH PERCENTAGE OF ILLITERATES

Education is free and compulsory "wherever there are schools," and though great strides are being made in this respect, the number of illiterates is still high, as it is estimated that about 50 per cent of the inhabitants can neither read nor write. There are two well-equipped universities—one at Bucharest, which has an attendance of more than 3,000 students, and a smaller one at Jassy, with about 500 students. The state is doing its best to raise the educational standard of the country by providing, among other measures, a number of special schools, among them being 8 normal schools, 12 commercial schools, 17 agricultural schools, and 6 schools of domestic economy for girls, in addition to which there are nearly 50 professional schools for boys, some of them state institutions and some private.

Military service is compulsory and universal. Under normal circumstances the young men from 19 to 21 receive a certain amount of primary training before they are called to the colors. At 21 they enter the regular army, serving for two years in the infantry and three years in the other branches of the service, after which they spend four or five years in the first reserve, being then transferred to the second reserve, and after that to the territorial corps; so that a man's average service in the army and reserves covers a period of some 21 years.

The means of communication in Rumania are excellent, there being nearly 2,000,000 miles of well-constructed national roads, and the railroads, which are all operated by the state, yield a handsome profit. In all, they amount to about 2,500 miles, of which more than 2,000 are state owned. In addition to the working of all the lines, the state has the direction of the commercial navigation service on the Danube and on the Black Sea.

Included in the population of the kingdom are many races not of Rumanian blood; for instance, in Moldavia there are thousands of Magyar descent, while in Dobrudja and Silistria the foreign element is strong—Turk, Tartar, Bulgar, Russian, and German being represented.

A CAUSE OF PERMANENT UNHAPPINESS

As is the case among the patriots of many European states, there is a permanent unhappiness in Rumania because of the fact that all Rumanians are not united under one flag. Not only is there a grievance against Russia because of Bessarabia, Hungary is also unloved on account of the many thousands of Rumanians living in Transylvania. In the latter province the Rumanians cling not only to their peculiar dress and language, never having been absorbed, but also distinguish themselves and their Orthodox faith by marking their houses with a Greek cross.

The Rumanians are a better-looking race than any of their neighbors. They are taller than the stocky Bulgar and have less stolid faces. There is often great beauty among the peasant women, and their costumes are the most brilliant in southeastern Europe. The Rumanians are of a southern European appearance, while their neighbors, with the exception of the Serbs, bear traces of their Oriental blood.

It is natural for them, like other races, to indulge in dreams of a day when a great Rumania can be formed. Yet the fulfillment of their ambition seems remote beyond possibility. These quasi-Latin people are not of a nature to make friends with their unlike neighbors, Slavs and Magyars, by whom they are entirely surrounded, but they must needs associate themselves politically for protection with the least aggressive of the two rival powers on their frontier.

MAP OF THE CAUCASUS, SHOWING THE HIGHLANDS OF DAGHESTAN

This isthmus, between the Caspian and the Black seas—a territory of 180,603 square miles—is under the jurisdiction of a governor-general. He rules, in the name of the Czar, over three provinces, or governments, north of the mountains (Caucasia) and over eleven south of them (Trans-Caucasia), inhabited by 11,735,100 people, of whom 87 per cent are illiterate. The population is extraordinarily mixed; no less than 46 distinct nationalities are recognized. Some of these peoples are nomadic stock-breeders, while others, the settled inhabitants, are in great part devoted to agriculture. There are only two large cities, Tiflis and Baku, both of which have about 200,000 inhabitants, but there are eight or nine other towns reaching the 50,000 mark. Taken as a whole, the Caucasus is distinctly prosperous; the exports from its Black Sea ports amount to some $50,000,000 annually, and show a tendency to increase each year. Petroleum is the most valuable product exported, followed by silk, wheat and other cereals, manganese ore, and timber. The imports do not amount to anything like the same value, reaching a total of only about $10,000,000, machinery being the most valuable item.

AN ISLAND IN THE SEA OF HISTORY

The Highlands of Daghestan

By George Kennan

IN THE southeastern corner of European Russia, between the Black Sea and the Caspian, in about the latitude of New York city, there rises abruptly from the dead level of the Tatar steppes a huge, broken wall of snowy, alpine mountains, which has been known to the world for more than 2,000 years as the great range of the Caucasus.

It is in some respects one of the most remarkable mountain masses in existence. Its peaks outrank those of Switzerland, both in height and in rugged grandeur of outline; its glaciers, ice-falls, and avalanches are all upon the most gigantic scale; the diversity of its climates is only paralleled by the diversity of the races that inhabit it; and its history, beginning with the Argonautic expedition and ending with the Russian conquest, is a more remarkable and eventful history than that of any other range on the globe.

Geographically, the Caucasus forms a part of the boundary line between southeastern Europe and western Asia; but it is not merely a geographical boundary, marked on the map with a red line and having no other existence. It is a huge natural barrier, 700 miles in length and 10,000 feet in average height, across which, in the course of unnumbered centuries, man has not been able to find more than two practicable passes—the Gorge of Dariel and the Iron Gate of Derbend.

Beginning at the Strait of Kertch, opposite the Crimea, on the Black Sea, the range trends in a southeasterly direction across the whole Caucasian Isthmus, terminating on the coast of the Caspian near the half-Russian, half-Persian city of Baku. Its entire length, measured along the crest of the central ridge, does not much exceed 700 miles; but for that distance it is literally one unbroken wall of rock, never falling below 8,000 feet and rising in places to heights of 16,000 and 18,000 feet, crowned with glaciers and eternal snow (see page 1135).

No other region that I have ever seen presents, in an equally limited area, such diversities of climate, scenery, and vegetation. On the northern side of the range lie the treeless wandering grounds of the Nogai Tatars—illimitable steppes, where for hundreds of miles the weary eye sees in summer only a parched waste of dry steppe grass, and in winter an ocean of snow, dotted here and there with the herds and the black tents of nomadic Mongols.

CHANGING FROM WINTER TO SUMMER WITHIN A MILE

But cross the great range from north to south and the whole face of Nature is changed. From a boundless steppe you come suddenly into a series of shallow, fertile valleys, blossoming with flowers, green with vine-tangled forests, sunny and warm as the south of France.

Sheltered by a rampart of mountains from the cold northern winds, vegetation here assumes an almost tropical luxuriance. Prunes, figs, olives, oranges, and pomegranates grow, almost without cultivation, in the open air; the magnificent forests of elm, oak, maple, Colchian poplar, and walnut are festooned with blossoming vines, and in autumn the sunny hillsides of Georgia, Kakhetia, and Mingrelia are fairly purple with vineyards of ripening grapes.

But climate here is only a question of altitude. Out of these semi-tropical valleys you may climb in a few hours to the highest limit of vegetable life and eat your supper, if you feel so disposed, on the slow-moving ice of a glacier.

High up among the peaks of this great Caucasian range lives, and has lived for centuries, one of the most interesting and remarkable peoples of modern times—a people that is interesting and remarkable not only on account of the indomitable bravery with which it defended its mountain home for 2,000 years against all

Photo from George Kennan

THE LOOKOUT ON THE HEIGHTS

"Upheavals, fractures, volcanic activity, and torrential floods had apparently tilted, faulted, disrupted, broken, and eroded the geological strata of Daghestan until not a single square mile of level and undisturbed ground was left" (see page 1111)

Photo from George Kennan

CHARACTERISTIC DAGHESTAN SCENERY

"The most vivid and faithful description could hardly do justice to the savage wildness of the scenery that was presented to us. . . . Even from the highest ridges and watersheds that we crossed nothing could be seen but a chaos of treeless mountains, high, isolated mesas, gigantic precipices, and deep, gloomy ravines, through which boiled and roared the rock-tormented waters of a hundred snow-born streams" (see text, page 1111).

comers, but on account of its originality, its peculiar social and political organization, and its innate intellectual capacity. I call it a people rather than a race, because it comprises representatives of many races and yet belongs as a whole to none of them. It is a heterogeneous aggregation of human odds and ends from all parts of the Old World.

AN ISLAND IN THE SEA OF HISTORY

The Caucasian range may be regarded for all ethnological purposes as a great mountainous island in the sea of human history, and on that island now live together the surviving Robinson Crusoes of a score of ship-wrecked states and nationalities—the fugitive mutineers of a hundred tribal *Bounties*.

Army after army has gone to pieces in the course of the last 4,000 years upon that titanic reef; people after people has been driven up into its wild ravines by successive waves of migration from the south and east; band after band of deserters, fugitives, and mutineers has sought shelter there from the storms, perils, and hardships of war. Almost every nation in Europe, in whole or in part, and at one time or another, has crossed, passed by, or dwelt near this great Caucasian range, and each in turn has contributed its quota to the heterogeneous population of the mountain valleys.

The Aryan tribes, as they migrated westward from central Asia, left a few stragglers among the peaks of this great range; their number was increased by deserters from the Greek and Roman armies of Alexander the Great and Pompey; the Mongols under Tamerlane, as they marched through Daghestan, added a few more. So, too, the Arabs, who overran the country in the eighth century, established military colonies in the mountains, which gradually blended with the pre-existing population. European Crusaders, wandering back from the Holy Land, stopped there to rest and never resumed their homeward journey. Finally, the oppressed and persecuted of all neighboring lands — Jews, Georgians, Persians, Armenians, and Tatars—fled to these rugged, almost inaccessible mountains as to a city of refuge where they might live and worship their gods in peace.

HOW THE MOUNTAINS MADE A NATION

In course of time these innumerable fragments of perhaps a hundred different communities or tribes, united only by the bonds of a common interest, were molded by topographical environment into a single conglomerate nationality, and became known to their lowland neighbors as *gortse,* or mountaineers. From a mere assemblage of stragglers, fugitives, and colonists they developed in the course of a thousand years into a brave, hardy, self-reliant people, and as early as the eighth century they had established in the mountain fastnesses of Daghestan, at the eastern end of the range, a large number of so-called "free societies," which were governed by elective franchise, without distinction of birth or rank. After that time, for another thousand years, they were never conquered.

Both the Turks and the Persians at different periods held the nominal sovereignty of the country, but so far as the mountaineers were concerned it was only nominal. Army after army was sent against them, only to return broken and defeated, until at last among the Persians it passed into a proverb: "If the Shah becomes too proud, just let him make war with the highlanders of Daghestan."

In 1801 these hitherto unconquered mountaineers came into conflict with the titanic power of Russia, and after a long and desperate struggle of nearly sixty years they were finally subdued and the Caucasus became a part of the Russian Empire.

At the present time the mountaineers as a class, from the Circassians of the Black Sea coast to the Lesghians of the Caspian, may be roughly described as a brave, hardy, liberty-loving people, who have descended from ancestors of widely different ethnological types and who are separable into tribes, or clans, of very different outward appearance; but who, nevertheless, are surprisingly alike in all

Photo from George Kennan

ON THE GEORGIA MILITARY ROAD

The pass of Dariel contains the Georgia military road, running from Vladikavkaz to Tiflis. The pass, shut in by lofty mountain walls sometimes 6,000 feet high, is of singular beauty and often so narrow that there is just room for the road and the turbulent River Terek, which runs alongside. Today a regular automobile service from Vladikavkaz to Tiflis is maintained through the pass.

Photo from George Kennan

THE MONASTERY OF ANANUR

This monastery, built in the 5th century, stands in one of the wider parts of the pass of Dariel. Some idea of the wildness of the people of this region—both then and now—can be gained from a glance at this edifice, which has rather the character of a fortress than an abode of peace and religion.

Photo from George Kennan

THE DESCENDANTS OF THE CRUSADERS

The Khevsurs of Tooshetia are among the few Christian tribes of the Caucasus and are said to be the descendants of the Crusaders. In the more remote sections of the mountains they have preserved the coats-of-mail of their ancestors, which they wear on certain ceremonial occasions.

psychological traits that grow out of and depend upon topographical environment.

They number perhaps a million and a half and are settled in small, isolated stone villages throughout the whole extent of the range from the Black Sea to the Caspian, at heights ranging from 3,000 to 9,000 feet. They maintain themselves chiefly by pasturing sheep upon the mountains and cultivating a little wheat, millet, and Indian corn in the valleys, and before the Russian conquest they were in the habit of eking out this scanty subsistence by making plundering raids into the rich neighboring lowlands of Kakhetia and Georgia.

ONE RELIGION, BUT MANY TONGUES

In religion they are nearly all Mohammedans, the Arabs having overrun the country and introduced the faith of Islam as early as the eighth century. In the more remote and inaccessible parts of the eastern Caucasus, there still remain a few isolated *aouls* (villages) of idolaters.

In Daghestan there are four or five thousand Jews, who, although they have lost their language and their national character, still cling to their religion; and among the high peaks of Tooshetia, in the same province, is settled a community of Christians, said to be the descendants of a band of medieval Crusaders. But these are exceptions; nine-tenths of the mountaineers are Mohammedans of the fiercest, most intolerant type.

The languages and dialects spoken by the different tribes of this heterogeneous population are more than thirty in num-

Photo from George Kennan

THE TOWERS AT PANSHETI

Along the Georgia military road, through the pass of Dariel, are isolated villages, each with its watch-towers like those shown in the picture. In former times constant watch was kept from these towers for the enemy who might at any moment come down the pass.

ber, and two-thirds of them are to be found in the province of Daghestan, at the eastern end of the range, where the ethnological diversity of the population is most marked. So circumscribed and clearly defined are the geographical limits of many Caucasian languages that in some parts of Daghestan it is possible to ride through three or four widely different linguistic areas in a single day.

Languages spoken by only 12 or 15 settlements are comparatively common; and on the headwaters of the Andiski Koisu, in southwestern Daghestan, there is an isolated village of 50 or 60 houses—the *aoul* of Innookh—which has a language of its own, not spoken or understood by any other part of the whole Caucasian population.

Prior to the Russian conquest none of these mountain languages had ever been written, but the early introduction of Arabic supplied to a great extent this deficiency. Almost every settlement had its mullah, or kadi, whose religious or judicial duties made it necessary for him to read and write the language of the Koran, and when called upon to do so he acted for his fellow-villagers in the capacity of amanuensis or scribe.

After the conquest the eminent Russian philologist, General Usler, invented alphabets and compiled grammars for six or eight of the principal Caucasian languages, and these are now taught in the government schools established under the auspices of the mountain administration at Vladikavkaz, Timour Khan Shoura, and Groznoi.

THE POLICEMAN SUPPLANTS THE PATRIARCH

In government the Caucasian highlanders before the Russian conquest acknowledged no general head, each separate tribe or community having developed for itself such system of polity as was most in accordance with the needs

and temperament of its component members. These systems were of almost all conceivable kinds, from the absolute hereditary monarchies of the Arab khans to the free communities or simple republics of central and southern Daghestan. In the former the ruler could take the life of a subject with impunity to gratify a mere caprice, while in the latter a citizen who regarded himself as aggrieved by a decision of the ruler could appeal to the general assembly, which had power to annul the decree or even to change the chief magistrate.

Since the Russian conquest the mountaineers have altered to some extent both their forms of government and their mode of life. Blood revenge and plundering raids into the valley of Georgia have nearly ceased. Tribal rulers in most parts of the mountains have given place to Russian *ispravniks* (chiefs of police); and the rude and archaic systems of customary law, which prevailed everywhere before the Russian conquest, are being slowly supplanted by the less summary processes of European jurisprudence.

THE CUSTOMS OF A THOUSAND YEARS AGO STILL FLOURISHING

Of course, the life, customs, and social organizations of a people who originated in the way that I have described, and who lived for perhaps 2,000 years in almost complete isolation from all the rest of the world, presented when they first became known many strange and archaic features. In the secluded valleys and canyons of the eastern Caucasus it was possible to study a state of society that existed in England before the Norman conquest, and see in full operation customs and legal processes that had been obsolete everywhere else in Europe for at least a millennium.

I had the good fortune to see the country before the fierce and wild population of the mountain valleys had been much influenced by Russian civilization; and in the unvisited and almost inaccessible fastnesses of southern Daghestan I found still in existence the men, customs, and ideas of the tenth century.

My attention was first attracted to the Caucasus as a promising field for exploration in the spring of 1868, when I passed through Moscow and St. Petersburg on my way home from eastern Siberia. The Caucasian war had then recently closed; and all Russia was ringing with romantic stories of the Daghestan highlanders—the Lesghians, the Chechenses, and the Avars—whose chivalrous and heroic courage had won the respect and admiration even of their enemies.

Russian regimental bands were playing, on the banks of the Neva, the strange, wild music that they had learned on the coast of the Caspian; exquisitely wrought shirts of chain-mail (see page 1093) and gold and silver hilted weapons made by the *gortse*, or mountaineers, were exhibited in the shop windows of St. Petersburg, and even the ladies showed their interest in the men whom their husbands and brothers had been fighting by adopting a part of the latter's picturesque costume and brightening the sidewalks of the Nevski Prospekt with the scarlet and white hoods of Circassian horsemen. Everybody who had visited the Caucasus spoke of it to me with the greatest enthusiasm as "the Russian Switzerland."

So much was my imagination stimulated by the descriptions which I heard that I determined to devote my first spare time and money to as thorough an exploration of the eastern Caucasus as circumstances would permit me to make.

WHAT MIGHT HAVE HAPPENED TO JOHN HAY

The plunge into this wild region without a companion seemed to me inexpedient if not unsafe, and in 1870 I proposed the trip to John Hay, who was then doing editorial work on the New York *Tribune* and who, I thought, might be interested in my plan. To my great delight he received the proposition with enthusiasm and agreed to sail for Russia with me in June of that year.

We had already begun to make preparations for the journey when, in the early spring, Mr. Hay informed me that

Photo from George Kennan

IN THE PASS OF DARIEL

Commanding the narrowest point in the whole pass, stands the ruined castle of Queen Tamara, the great twelfth century queen of Georgia, which at one time could hold the pass against all comers. Even in this wild defile it is difficult to escape the march of progress. Note the telegraph wires beside the castle.

Photo from George Kennan

THE DARIEL PASS IN WINTER

To cross the Caucasus in winter, even by the most practicable of the passes, is an undertaking of no small difficulty. The traveler has often, literally, to dig his way through the snow, as can be seen from the picture.

he had entered into an engagement of marriage, and that in view of this fact he thought it would not be practicable for him to join me in the proposed exploration. From one point of view, it is perhaps unfortunate that Mr. Hay's engagement did not begin a year later.

If he had gone to the Caucasus he might have written a book even more striking and brilliant than "Castilian Days," and might still have had the happy married life and the distinguished public career that were then awaiting him. It is easy to imagine what a story he would have given to the world if it had been possible for him to get back into the Europe of Charlemagne, and that practically is what he might have done if he had explored the high and wild ravines of southern Daghestan in 1870.

After having made several unsuccessful attempts to find a traveling companion in place of Mr. Hay, I was eventually compelled to sail for Russia alone, and reached St. Petersburg about the first of July. In August I proceeded by rail to Nijni Novgorod, took a steamer down the River Volga to Astrakhan, circumnavigated the northern end of the Caspian Sea, and finally landed early in September at Petrovsk, a small port on

Photo from George Kennan

THE HEAD WATERS OF THE ANDISKI KOISU

Around the upper reaches of the Andiski Koisu is a veritable Babel, for the inhabitants of that region possess such a variety of language that the traveler finds a new one every few miles. Tongues used by only a dozen villages are common, while there is one mountain settlement which is the proud possessor of a language spoken nowhere else (see text, page 1094).

Photo from George Kennan

THE VILLAGE OF KAZBEK

This is one of the villages which are found from time to time by the traveler in the wider parts of the pass of Dariel

the northern side of the mountains in the east Caucasian province of Daghestan.

THE GATE OF THE CAUCASUS

The roads leading back into the interior from this point were only two in number. One ran westward up the valley of the Terek to the town of Vladikavkaz, and then crossed the great range, by the Dariel pass (see pp. 1091, 1096), to Tiflis, while the other took a more southerly course through the foothills to Timour Khan Shoura (the village of Tamerlane), where it ended in a great maze of treeless peaks, ravines, and precipices, traversed only by narrow and perilous bridle paths.

The first of these roads was the safer and easier one to follow, but the second offered greater inducements in the shape of novel and adventurous experience, and after a few hours' deliberation I ordered post horses and a *tarantas* (a Russian traveling carriage) and proceeded to Timour Khan Shoura.

As the distance from Petrovsk to the provincial capital was not great, I covered it in a single day, and put up that night in a small and extremely primitive hotel on the threshold of the wild region known to the Daghestan highlanders as "the land of mountains."

Early on the following morning I began to make inquiries with regard to the possibility of riding through Daghestan on horseback and crossing the great range into the valley of Kakhetia (see map, page 1086). Exploring the Caucasus had seemed to me easy enough while I sat in my library at home and traced out possible routes on the map with my pencil, but when I arrived on the ground the undertaking assumed a very different aspect.

Photo from George Kennan

THREE GEORGIAN BELLES

For centuries the women of Georgia have had a reputation for beauty equaled only by that of the Circassians. It may be that the standard of beauty is not high in the near East, for these three Georgians, even in their national costume, can hardly be described as ravishing.

THE HANDICAP OF A NEW LANGUAGE EVERY 15 MILES

The geography of the country, with its barbarous Turkish and Tatar names, was wholly unknown to me. The Russian language, upon which I had chiefly relied, proved to be almost useless in a region where the language changed every 10 or 15 miles. The bridle paths in southern Daghestan were represented to me as high "cornice" trails, difficult and dangerous at any time and absolutely impassable in bad weather; and the people of the remote mountain valleys were said

Photo from George Kennan

HUSBAND AND WIFE

This couple are from Bollikh, in western Daghestan. The costume of the man exhibits the features common throughout the Caucasus—the conical lamb's-wool cap, the long coat, the silver cartridge cases, and the elaborately decorated dagger and sword. The dress of the wife is more curious than beautiful and is by no means frequently seen.

Photo from George Kennan

A RUDE BRIDGE IN THE MOUNTAINS

"Through these eroded galleries run mountain streams, which are generally rapid but narrow and which are spanned where the bridle paths cross them by rude log-and-plank bridges. . . . It is so difficult to throw them across the boiling torrents of Daghestan that in all the mountain communities the punishment for willful destruction of a bridge is death" (see text, page 1117).

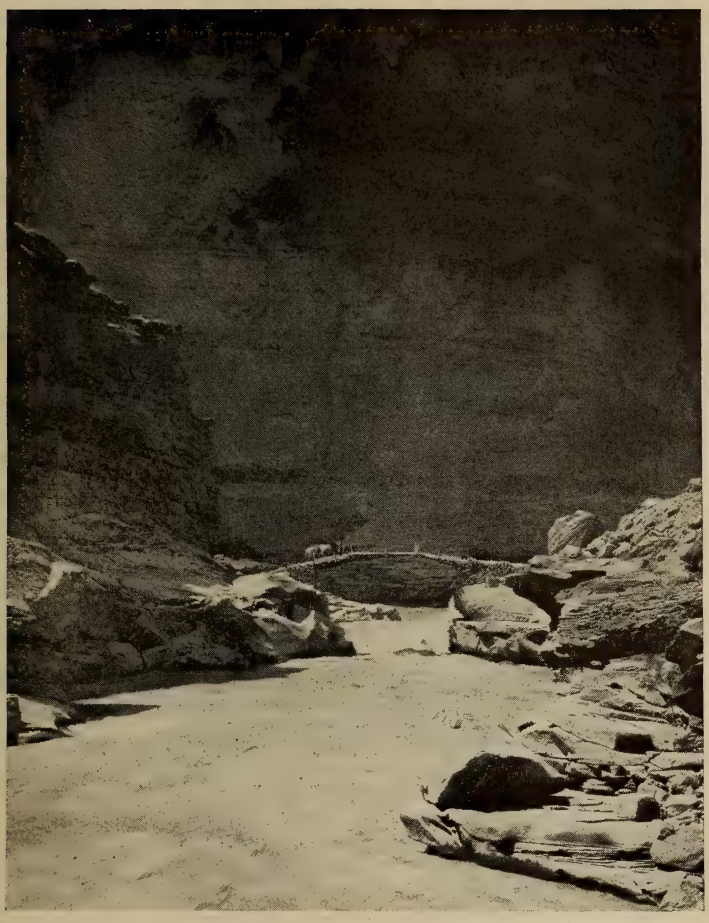


Photo from George Kennan

A BRIDGE-SPANNED TORRENT

"The ravines through which these bridge-spanned torrents flow make travel across the country extremely difficult. Getting out of one and into another involves four or five hours of climbing or sliding on steep zigzags, and a ride of 10 miles across two or three of them is a hard day's journey" (see text, page 1117).

to be so unfamiliar with west Europeans that it would be extremely hazardous to go among them without an armed escort.

Most of the Russians whose advice and assistance I asked assured me that my plan of crossing the great range and descending into the valley of Kakhetia was wholly impracticable. "We ourselves," they said, "would hesitate to undertake such a trip, and how can you—an American without knowledge or experience—expect to make it"?

All my efforts to get guides, horses, and interpreters were fruitless, and for a whole week I wandered around the bazaars and narrow, muddy streets of Timour Khan Shoura, waiting for something to turn up. Nothing, however, did turn up, and how to turn something up I did not know.

A GEORGIAN NOBLE

My patience and self-confidence were fast becoming exhausted when I accidentally heard one morning that a certain Prince Djordjadzi—a Georgian nobleman in the Russian service—had just arrived in Timour Khan Shoura and would leave there on the following day for his home in the trans-Caucasian valley of the Alazan. He had a full force of guides and interpreters and a large armed escort, and his intention was to ride through the wildest, least known part of the eastern

Photo from George Kennan

A TATAR WITH BUFFALO

Caucasus and cross the great range into Kakhetia at a height of 12,000 feet. Here apparently was the opportunity I had been longing for.

I called at once on Prince Djordjadzi, introduced myself as an American traveler, explained my plans, and requested permission to join his party. The prince, a fine-looking, gray-haired man, 55 or 60 years of age, began at first to make objections, on the ground that I had had no mountain experience and was unaccustomed to the fatigue and hardship that such a journey would involve. When, however, I had given him a hasty account of my explorations in Kamchatka and northeastern Siberia, he yielded, rather ungraciously, and said: "Get yourself some heavy riding boots, a horse-hair cloak (*burka*), and a pair of saddle-bags, and be prepared to leave here tomorrow afternoon at half past one."

I hurried back to my hotel, bought the necessary equipment, sold or gave away all of my clothing that could not be carried on horseback, and before night my preparations were complete. At 2 o'clock on the following afternoon Prince Djordjadzi sent one of his aides to my room to tell me that his party was ready to start.

PICTURESQUE TRAVELING COSTUMES

The scene presented by the courtyard of the governor's house when I reached there was, to American eyes, a most novel and striking one.

Prince Djordjadzi, in a muff-shaped hat of Persian lamb's-wool and a green silk *khalat* confined at the waist with a massive silver belt, stood on the veranda of the governor's house, talking with General Tergukasof and three or four other officers in the brilliant uniform of the Caucasian staff; 25 or 30 mountaineers, in long-skirted maroon coats adorned with rows of ivory cartridge tubes, high cylindrical hats of black curly wool, white stormhoods of felted camel's

hair, and tight scarlet leggings bound with golden braid, were already in the saddle, adjusting their silver-mounted rifles, pistols, sabers, and poniards, while they awaited the signal for a start; orderlies were running hither and thither in search of mislaid or forgotten equipment, and the air was filled with the shouting of men, the neighing of impatient horses, and the sharp clank of weapons.

In course of time order was brought out of the prevailing confusion, and at half past two we climbed into our high Tatar saddles and rode away, through the Avarski gate, into the highlands of Daghestan.

Our first day's journey, owing to the lateness of our start, was not a long one, and after a ride of two or three hours through narrow, wooded ravines we came out, just before sunset, into a shallow, open valley, and caught sight of the village where we were to spend our first night. It was the *aoul,* or mountain settlement, of Joongootai.

AN AWE-INSPIRING BUT HEARTY WELCOME

The inhabitants had evidently received notice of our coming, and while we were still a quarter of a mile distant a mounted sentinel, who had apparently been watching for our approach, chirruped to his horse and dashed away at a gallop for the village, firing his long silver-banded rifle into the air and brandishing it furiously above his head in order to attract the attention of his fellow-villagers. The signal was promptly obeyed.

In a moment a large party of mountaineers, richly dressed and glittering with silver-mounted weapons and cartridge tubes, came galloping out of the stone gate of the village, lashing their horses with the hinged whips pictured on the monuments of Assyria; shouting, whooping, and yelling in what seemed to be the fierce excitement of battle, and firing at us incessantly as they dashed furiously down upon our escort. It stirred one's pulses to see the splendid impetuosity of the attack; but not knowing what it all meant, I almost instinctively reined in my horse and felt for the butt of my revolver.

On came the charging horsemen, like the Light Brigade at Balaklava, with a tumult of whooping, yelling, and firing that swelled into a great battle crescendo as they drew near. The distance between us narrowed to 50 feet, 30 feet, 10 feet, until the living thunderbolt of men and horses seemed actually to strike us. Then suddenly up went the hand of the leader, back went the trained horses upon their haunches as the sabers of their riders flashed in the air, and the whole attacking force in mid-career halted, slid a yard or two, and stopped within 6 feet of Prince Djordjadzi's saddle-peak.

For an instant the horsemen, with uplifted sabers, faced us in a superb battle tableau; then, with a great cry of *Asalaam alaikoum!* (Peace be with you) they sheathed their weapons, dismounted from their high Tatar saddles, and advanced on foot to greet Prince Djordjadzi with the clasping fingers and upraised thumbs of Caucasian custom, but without the shaking of hands that is practiced in the West. I have witnessed impressive ceremonial receptions in many lands, but nothing to equal in dramatic effect the Caucasian *jigatofka*—the sham attack of a party of fighting highlanders upon a guest whom they wish to honor.

THE HIGHLANDERS AT CLOSE RANGE

In 10 minutes more we were comfortably seated on a rug-covered divan in the house of a mountaineer named Aleskandir Bek, Prince Djordjadzi receiving calls from his friends and acquaintances, while I drank cup after cup of fragrant Russian tea and watched the callers. They were all Lesghians of the clan known as Avars, and in stature, features, and coloring they differed little from men of the Teutonic and Anglo-Saxon stock.

All had the hawk-like intensity of gaze that is characteristic of mountaineers generally, as compared with lowlanders, but in other respects they were west Europeans; and in the dress of Great Britain or Germany they would undoubtedly have been taken for Englishmen, Scotchmen, Bavarians, or Saxons. They would have impressed me, however, in any dress and in any part of the world as outdoor men of strong character and fighting capacity.

Photo from George Kennan

THE TATESKI MONASTERY: KAKHETIA VALLEY

The isolated valleys of the Caucasus form ideal spots for those who wish to withdraw from the world, and consequently monasteries are not infrequent. It must be noted, however, that most of them have been fortified as a protection against the proselytizing zeal of Moslem neighbors.

In a few moments Aleskandir Bek took a seat by my side, remarked in broken Russian that he had never before seen a foreigner in Daghestan, and asked if he might be permitted to inquire my business. I told him frankly that I was a vagabond American, traveling for the love of it, seeing strange sights and mingling with strange people, in order that I might describe both some day in a book. He laughed pleasantly and said that in Joongootai, at least, I should have something to write about, because he had arranged for that evening, in honor of Prince Djordjadzi, a little Caucasian dancing party, which would give me some idea, perhaps, of Daghestan amusements and social life.

A CAUCASIAN NIGHT'S ENTERTAINMENT

In the course of an hour, before we had finished our last cup of tea, the piercing notes of a Daghestan fife, mingled with the muttering of kettle-drums and tambourines, could be heard in the courtyard, and we all went out on the broad veranda to see the beginning of a Caucasian night's entertainment. The yard was ablaze with torches and iron cressets filled with flaming firebrands, and was crowded with tall, bearded Lesghians, whose silver-mounted pistols, daggers, and cartridge tubes flashed fitfully in the red torchlight as they moved from place to place.

Near the veranda, in a little group, stood the women, richly dressed in filmy laces and bright-colored Persian silks, with long white veils concealing their hair and hanging down their backs to their red-slippered heels. Overhead was the slender stone minaret of the village mosque, outlined clearly against the dark starry sky, and from its high, circular gallery two white-turbaned *mullahs,* or Mohammedan priests, looked down curiously into the crowded, torch-lighted courtyard.

In a few moments our host cleared an open space in the center of the yard, shouted to the musicians to strike up, and the dancing began. One of the mountaineers stepped into the ring, laid his right hand, palm outward, against his right cheek, extended his left arm at full length, bent down his head, and began to dance rapidly around in a narrow circle, keeping step to the throbbing of the kettle-drums and the measured, rhythmical hand-clapping of a hundred spectators.

In a moment he was joined by a bright-eyed, graceful young woman, who floated out to meet him from the little group near the veranda, and from whose outstretched arms hung long, flowing sleeves of pea-green silk to a depth of at least a yard. As she sailed out on tip-toe, with expanded silken wings and downcast, blushing face, she looked—in the estimation of Prince Djordjadzi—"like a terrestrial angel just about to take flight!"

DANCING TO THE MUSIC OF PISTOLS

With the appearance of the woman began the exciting part of the dance. The clapping of hands and the roll of the deep-toned kettle-drums almost drowned the shriek of the tormented fife, and now and then both were lost in a crashing fusillade of pistol shots fired into the air by the sympathetic spectators for the purpose of enlivening the proceedings by increasing the noise and enthusiasm. In two or three minutes the young woman glided out of the ring and rejoined her companions; her partner touched his hat and also retired, and a second couple took their places, the clapping of hands and pistol firing going on as before (see page 1131).

Dancing, interspersed with peculiar native games and musical improvisations, which were full of humorous personal hits and excited shouts of laughter, continued until a late hour of the night, when an elaborate Asiatic supper was served on the earthen, rug-covered floor of the stone-walled house. Finally, at 2 o'clock in the morning, we went to bed on the broad divan and fell asleep listening to a serenade sung by the women of the village under our windows with the monotonous refrain of "Hài! Hài! An-nan-nàn-nan-nài! An-nan-nài!" (the Caucasian equivalent of "Là! Là! La-la-là-la-là! La-la-là!").

Photo from George Kennan

THE KHARTIKHUNSKI RAVINE

"Some of these gorges are 10 or 15 miles long and 2,000 feet deep—immense natural galleries, carpeted with alpine grass, frescoed above with drifting clouds, and having whole villages hung against their walls for pictures" (see text, page 1115).

Photo from George Kennan

THE CROOKED TRAILS OF DAGHESTAN

"The road . . . wound through dark canyons with almost precipitous sides, now descending to the edge of a roaring torrent, then climbing in a series of shelf-like zigzags to a height of a thousand feet, running for a quarter of a mile along the brink of a tremendous precipice, climbing again half a dozen more zigzags, crossing a divide, and finally plunging into a gorge equally dark, gloomy, and precipitous on the other side" (see text, pages 1111 and 1115).

Photo from George Kennan

THE SULPHUR MINE OF KHIYUT

The mining industry of the Caucasus is rapidly growing in importance, despite the lack of good means of communication. The whole of this region is very rich in mineral deposits. Copper and manganese are obtained in large quantities; quick-silver, sulphur, and iron mines are worked, and good steam coal is known to exist.

THE BOUNDLESS HOSPITALITY OF THE MOUNTAINEERS

At all the large *aouls* in northern Daghestan, where Prince Djordjadzi was well known, we were received with boundless hospitality. Cattle and sheep innumerable were slaughtered for barbecues and pilaus. Everything in the shape of food that the country afforded was set before us; and night after night we reclined on a soft rug at the door of some mountaineer's house, with a bonfire blazing in the courtyard, and listened to the songs of the Lesghians, or watched the brilliantly dressed men and women whirling in their strange national dance to the barbaric music of fifes, bagpipes, kettle-drums, and tambourines. The inhabitants of northern Daghestan, living in comparatively wide and open valleys and within easy reach of a market, are much more wealthy and civilized than those whose homes are far back in the deep valleys or on the precipitous terraces of the high mountains, and their social customs have been more or less modified by intercourse with the Russians.

We soon left behind us, however, these hospitable villages and plunged into the wonderful labyrinth of dark ravines in central Daghestan (see pages 1088 and 1089). The most vivid and faithful description could hardly do justice to the savage wildness of the scenery that was presented to us as we rode southward toward the headwaters of the rushing torrent known as the Avarski Koisu.

Upheavals, fractures, volcanic activity, and torrential floods had apparently tilted, faulted, disrupted, broken, and eroded the geological strata of Daghestan until not a single square mile of level and undisturbed ground was left. Even from the highest ridges and watersheds that we crossed nothing could be seen but a chaos of treeless mountains, high, isolated mesas, gigantic precipices, and deep, gloomy ravines, through which boiled and roared the rock-tormented waters of a hundred snow-born streams.

So far as I could judge without accurate geological knowledge, Daghestan consisted originally of an extensive plateau of sedimentary limestones and shales, which was tilted up by the elevation of the main range until its southern edge lay on the granitic rock of the mountain backbone at a height of perhaps 8,000 feet. From that point it sloped northward and downward until it reached the level of the sea at the boundary of the south Russian steppes.

HOW NATURE CHANGED A PLAIN INTO A WALL

At the time of its formation, or perhaps earlier or later, this sloping plateau was more or less broken and dislocated by upheavals of igneous rock, and was then cut, channeled, and furrowed into deep, narrow ravines and canyons by scores of mountain torrents, which rose in the high trough between the main range and the so-called snowy range and ran down the 8,000-foot slope to the level of the Caspian.

I do not know that this is a scientifically accurate explanation of the present contour of Daghestan; probably it is not; but at least it accounts in a conjectural way for many of the striking topographical features of the country. Scores of the peaks and ridges that have pierced or fractured the limestones and shales between the steppes and the main range are unquestionably granitic.

The great sulphur mine of Khiyut (see page 1110) affords evidence of volcanic action; and the deep, narrow gorges of the Koisus and their tributaries show the effects of running water as clearly as do the canyons of Arizona. If a line could now be drawn from the main range to the Russian steppes across the tops of the isolated mesas that stand here and there in the labyrinth of deep gorges, it would represent, roughly, the slope of that ancient uptilted plateau before it had been cut into a maze of gloomy galleries by the eroding action of running water.

UNRIVALED MOUNTAIN SCENERY

The road—or rather the bridle path—that we followed after leaving Joongootai wound through dark canyons with almost precipitous sides, now descending to the edge of a roaring torrent, then climbing in a series of shelf-like zigzags to a

Photo from George Kennan

THE KHONKADATEL RAVINE

"The great ravine of Khonkadatel is 3,000 or 4,000 feet deep, and the trail that leads into it crosses the faces of tremendous precipices on narrow cornices or shelves, descends rude stairways of hewn rock a hundred feet in length, and runs down steep zigzags to sharp corners, where a horse must turn within his own length or slide off into a thousand feet of empty air" (see text, page 1117).

Photo from George Kennan

THE AOUL OF KUMALI

This picture is typical of many villages in the Caucasus. They are situated in almost treeless valleys, surrounded by bare rocks and slopes forbidding in their steepness, while the rough-built houses of the little communities are scarcely to be distinguished from the crags among which they stand.

Photo from George Kennan

THE VILLAGE OF GIMRY

"The descent into the valley of Gimry is made by a zigzag bridle path 13 miles in length, although the distance from the top of the cliff to the bottom in an air line is probably less than a mile" (see text, page 1117)

Photo from George Kennan

THE ENTRANCE TO A VILLAGE

"In some *aouls* the streets, or passages, from house to house are dark underground corridors, out of which the inhabitants climb into their dwellings on perpendicular ladders or notched logs" (see text, page 1117).

height of a thousand feet, running for a quarter of a mile along the brink of a tremendous precipice, climbing again half a dozen more zigzags (see page 1109), crossing a divide, and finally plunging into a gorge equally dark, gloomy, and precipitous on the other side.

These canyon-like ravines are the most striking topographical features of central Daghestan (see pages 1089 and 1108). They are seldom more than 300 or 400 feet wide at the bottom, and are shut in by high walls, which are either sheer precipices or steep slopes broken into narrow, step-like terraces by outcropping ledges of sedimentary rock (see page 1134). Some of these gorges are 10 or 15 miles long and 2,000 feet deep—immense natural galleries, carpeted with alpine grass, frescoed above with drifting clouds, and having whole villages hung against their walls for pictures.

Photo from George Kennan

A NEARER VIEW OF GIMRY

"Some of these *aouls* are so much like New Mexican pueblos, both in location and in architecture, that they would seem to have been built by closely related peoples; but the resemblances, of course, are due to similarity of environment and conditions, not to a common ethnological inheritance" (see text, page 1121).

Through these eroded galleries run mountain streams, which are generally rapid but narrow and which are spanned where the bridle paths cross them by rude log-and-plank bridges of the type shown on pages 1102 and 1103. Bridges of this kind are to be found in many parts of western Europe, and are common in Scandinavia; but it is so difficult to throw them across the boiling torrents of Daghestan that in all the mountain communities the punishment for willful destruction of a bridge is death.

The ravines through which these bridge-spanned torrents flow make travel across the country extremely difficult. Getting out of one and into another involves four or five hours of climbing or sliding on steep zigzags, and a ride of 10 miles across two or three of them is a hard day's journey. The descent into the valley of Gimry (see page 1114), for example, is made by a zigzag bridle path 13 miles in length, although the distance from the top of the cliff to the bottom in an air line is probably less than a mile.

The great ravine of Khonkadatel is 3,000 or 4,000 feet deep, and the trail that leads into it crosses the faces of tremendous precipices on narrow cornices or shelves, descends rude stairways of hewn rock a hundred feet in length, and runs down steep zigzags to sharp corners where a horse must turn within his own length or slide off into a thousand feet of empty air (see page 1112).

THE VILLAGES PERCHED LIKE EAGLES' NESTS AMONG THE CRAGS

As we gradually approached the main range, the *aouls,* or mountain villages, became more and more daring and picturesque in their locations. Settlements in the valley bottoms grew less and less frequent and finally disappeared altogether, while high overhead every precipice, every terrace, or projecting buttress of rock was crowned with the flat-roofed, closely massed houses of an *aoul.*

As the heterogeneous clans of the mountain population have been at war for centuries, they have learned to build their villages in places that can be easily defended, and from the bottoms of the valleys they look like eagles' nests, and seem at first glance to be absolutely inaccessible.

The *aoul* of Ochau, for example, in southwestern Daghestan, was situated on a terrace, or shelf of rock, not less than 2,000 feet above the valley of the Avarski Koisu, and was reached by a narrow trail which climbed the precipitous side of the great ravine in more than 20 zigzags. We were directly under the village before sunset; but long ere we reached it, it had begun to grow dark, the alpine gorge had filled with clouds, and we found ourselves climbing heavenward, on a never-ending ladder of zigzags, in a great ocean of chilling vapor.

To reach that settlement from the bottom of the valley cost us more than two hours of hard climbing; but we struggled up into the clear evening twilight at last and looked down from our rocky Ararat upon the great white sea of clouds out of which we had come and into which we should have to descend on the following morning.

PUEBLO-LIKE ARCHITECTURE FOUND IN DAGHESTAN

Many of the *aouls* of central and southern Daghestan bear a striking resemblance to the pueblos and cliff-dwellings of New Mexico. The stone-walled houses are built together in a compact mass on the steep slope of a high terrace, and the flat roofs rise in tiers or steps, one above another, just as they do in the settlements of our pueblo Indians. The roof of one house forms a small square front yard for the occupants of the house next above it, and ladders serve as means of intercommunication between the roofs of the ascending tiers (see page 1118).

In some *aouls* the streets, or passages, from house to house are dark underground corridors, out of which the inhabitants climb into their dwellings on perpendicular ladders or notched logs. As the country is nearly treeless and affords comparatively little wood, the walls of the one-story buildings are almost invariably of roughly broken stone and the roofs and floors are usually of clay mixed with chopped straw and beaten hard.

Near the center of every large village

Photo from George Kennan

THE PUEBLO-LIKE DWELLINGS OF DAGHESTAN

"Many of the *aouls* of central and southern Daghestan bear a striking resemblance to the pueblos and cliff-dwellings of New Mexico. The stone-walled houses are built together in a compact mass on the steep slope of a high terrace, and the flat roofs rise in tiers or steps, one above another, just as they do in the settlements of our pueblo Indians. The roof of one house forms a small square front yard for the occupants of the house next above it, and ladders serve as means of intercommunication between the roofs of the ascending tiers." (see text, page 1115)

Photo from George Kennan

THE ROUGH STONE DWELLINGS OF THE VILLAGES

"As the country is nearly treeless and affords comparatively little wood, the walls of the one-story buildings are almost invariably of roughly broken stone and the roofs and floors are usually of clay mixed with chopped straw and beaten hard" (see text, page 1117)

Photo from George Kennan

AN AOUL OR MOUNTAIN VILLAGE

"As we gradually approached the main range, the *aouls*, or mountain villages, became more and more daring and picturesque in their locations. . . . As the heterogeneous clans of the mountain population have been at war for centuries, they have learned to build their villages in places that can be easily defended, and from the bottoms of the valleys they look like eagles' nests, and seem at first glance to be absolutely inaccessible" (see text, page 1117).

rises the slender stone minaret of the Mohammedan mosque, and on some high point of vantage stands a square loop-holed war-tower, in which the surviving inhabitants take refuge and defend themselves to the last when their village has been taken by assault. Some of these *aouls* are so much like New Mexican pueblos, both in location and in architecture, that they would seem to have been built by closely related peoples; but the resemblances, of course, are due to similarity of environment and conditions, not to a common ethnological inheritance.

The mind of man thinks and reasons in the eastern Caucasus just as it does in Arizona and New Mexico, and when the environment and the conditions are the same, the results are almost identical.

THE WONDERFUL RACIAL TYPES OF THE CAUCASUS

Although the *aouls* of Daghestan closely resemble one another in situation and type, the people who live in them differ widely in features, coloring, language, and origin. Some of them have the blue eyes, blond beards, and fair skin of the Germans described by Tacitus, while others are unmistakably Jews, Tatars, Persians, Armenians, or colonists from the Mediterranean.

I do not mean that they have had any recent connection with the people now called by those names. Their ancestors separated from the ancestors of the latter perhaps thousands of years ago. Many of the Tatars are descendants of the wild nomads who rode westward from central Asia under Genghis Khan and Tamerlane; the Jews were certainly settled in the eastern Caucasus long before the birth of Christ; the Teutons were probably there before any of the Aryan tribes moved into the territory that is now Germany, and the Mediterranean colonists sailed from Italy and Greece perhaps as early as the time of Æschylus and Pindar.

But the Jews, Teutons, Celts, Persians, Arabs, and Monglos who now live in the eastern Caucasus are not brothers of the peoples called by the same names in Asia and western Europe; they are cousins a hundred times removed. Long isolation and a mountainous environment, moreover, have so modified them psychologically that they no longer resemble the peoples to whom they are ethnologically related (see page 1127).

In character and temperament they are much more like one another than they are like the races and nationalities whose physical types they still retain. Their features and coloring are those of their remote ancestors; but their minds all bear the impress of the mountainous environment in which, for hundreds of generations their forefathers lived.

Their languages, even, have changed to such an extent that they are hardly recognizable as variations of Aryan, Semitic, or Mongolian speech. Seventeen different languages are spoken by the highlanders of Daghestan, but only a few of them can be referred with certainty to any known linguistic stock. In some parts of the province I heard the sharp, peculiar clicks which are characteristic of certain south African tongues, but which do not occur as consonantal sounds in any of the written languages of Europe or Asia.

MOHAMMEDANS WHO COULD BE MISTAKEN FOR SCOTTISH ELDERS OF THE KIRK

The predominant ethnological types in the parts of Daghestan that I visited were Teutonic or Celtic. Some of the men whom I saw would have been taken for Germans in any capital of western Europe, while others were so unmistakably Scottish that they might have been McKenzies, McDonalds, or McLeans from Argyle or Inverness. A Daghestan highlander of the Scots type is shown on page 1125. If this man, in Canadian dress, should walk into a Presbyterian kirk in Nova Scotia on a Sunday morning, every member of the congregation would take him for Scotsman, and would expect him to understand the Gaelic sermon and join in the singing of the Gaelic psalms. And yet he and his ancestors have probably lived in the Caucasus for a thousand years.

Intellectually, these highlanders of the Teutonic, Anglo-Saxon, and Celtic type are more nearly akin to us Americans than are any of their hundred-times-re-

Photo from George Kennan

A GATHERING OF THE CHIEFS

This picture shows an assemblage of the headmen from various mountain villages throughout Daghestan. Note the extraordinary variety of facial types. The old gentleman with the white beard would pass anywhere for a Scotsman, while his neighbors on either side are unmistakably Asiatic.

Photo from George Kennan

GEORGIAN WOMAN IN NATIONAL DRESS

Georgia lies to the south of Daghestan, and for 2,000 years was an independent kingdom. Its inhabitants are pure Caucasians and often singularly handsome, and so during the period of Moslem domination Georgia supplied great numbers of female slaves for Turkish harems and recruits for the famous corps of Mamelukes.

Photo from George Kennan

HIGHLANDERS IN THE RUSSIAN SERVICE

The natives of the Caucasus have taken arms eagerly in the Russian army. There are three divisions of Caucasian Cossacks, a brigade of infantry, two cavalry divisions, and two brigades of rifles, each of four battalions, and all of them composed of these hardy warriors from the

Photo from George Kennan

A DAGHESTAN CELT

This old lady, a Moslem of the Moslems, presents such a marked Celtic type that if she were found sitting outside a cottage door in Wales or Cornwall no one would ever suspect that she was not a native of the British Isles.

Photo from George Kennan

A SCOTSMAN OF DAGHESTAN

"If this man, in Canadian dress, should walk into a Presbyterian kirk in Nova Scotia on a Sunday morning, every member of the congregation would take him for a Scotsman, and would expect him to understand the Gaelic sermon and join in the singing of the Gaelic psalms" (see text, page 1121).

Photo from George Kennan

JEWISH GIRLS OF THE CAUCASUS

In Daghestan there are four or five thousand Jews who have been out of touch with their co-religionists for centuries. They have lost their language and their national character, but still cling tenaciously to their religion.

Photo from George Kennan

A PERSIAN

In the lowlands of the eastern Caucasus are many colonies of pure-blooded Persians, now under allegiance to Russia

Photo from George Kennan

A MOUNTAINEER OF THE GERMAN TYPE

"The Jews, Teutons, Celts, Persians, Arabs, and Mongols who now live in the eastern Caucasus are not brothers of the peoples called by the same names in Asia and western Europe; they are cousins a hundred times removed" (see text, page 1121).

Photo from George Kennan

A HIGHLANDER OF THE ITALIAN TYPE

"In character and temperament they are much more like one another than they are like the races and nationalities whose physical types they still retain. Their features and coloring are those of their remote ancestors; but their minds all bear the impress of the mountainous environment in which, for hundreds of generations, their forefathers lived" (see text, page 1121).

Photo from George Kennan

A CAUCASIAN FALCONER

Among the many customs of the past which still survive in the highlands of Daghestan is that of falconry. Falcons and hawks are carefully trained for the chase and are used in hunting birds and small game animals.

Photo from George Kennan

A CAVALRYMAN

As might be expected from a warlike race, many of the Daghestan highlanders have taken service in the Russian army.

Photo from George Kennan

AN ARMENIAN

Among the many racial types found in the Caucasus the Armenians are well represented. They live on the southern side of the range, mainly in the valleys of the foothills, and are seldom found in the higher parts of the mountains.

moved cousins in Germany, England, and Scotland. There is no form of American wit or humor that would not be instantly understood and keenly appreciated in scores of Caucasian *aouls,* and many anecdotes that are current in the United States have been independently thought out and put into effective literary shape by the mountaineers of Daghestan.

WHERE AMERICAN HUMOR IS AT HOME IN RUSSIA

American jokes, bragging stories, and humorous exaggerations can be put into the brains of these quick-witted highlanders without a surgical operation, and many of their skits and yarns are precisely like ours, both in spirit and in form. I heard one night, in a lonely Caucasian *aoul,* a humorous story that had been told me less than a year before by a student of the Western Reserve College at Hudson, Ohio, and that was doubtless invented, independently, by brains 6,000 miles apart.

But the Caucasian mountaineers have more kinds of jokes, stories, and anecdotes than we have. Living as they do on the boundary line between Europe and Asia, made up as they are of many diverse races—Aryan, Mongolian, and Semitic—they inherit all the traditionary lore of two continents, and hand down from generation to generation the fanciful tales of the East, mingled with the humorous stories, the witty anecdotes, and the practical proverbs of the West.

You may hear today in almost any Caucasian *aoul* didactic fables from the Sanscrit of the *Hitopadesa,* anecdotes from the *Gulistan* of the Persian poet Saadi, old jokes from the Grecian jest-book of Hierocles, and humorous exaggerations which you would feel certain must have originated west of the Mississippi River.

The poems of the Daghestan highlanders, and especially their war songs and laments, show that while they are temperamentally fighters, and often blood-avengers or brigands, they have strong human feelings and many fine mental and emotional traits. Their indomitable fortitude is expressed in the noble proverb, "Heroism is endurance—for one moment more," and their hospitality in the proverbial saying, "A guest—a man from God."

PATHOS AND POETRY OF THE MOUNTAIN FOLK SONGS

They are passionately fond of music, skillful in metrical improvisation, and gifted with delicate poetic sensibility. What could be more imaginative in conception and felicitous in expression, for example, than this colloquy between mother and daughter, which is translated without embellishment from a well-known Daghestan song.

The daughter says:

"Come out of doors, O mother! and see what a wonder is here!
Up through the snows of the mountain the flowers of spring appear!
Come out on the roof, O mother! and see how along the ravine
The glacier ice is covered with the spring-time's leafy green!"

The mother replies:

"There are no flowers, my daughter, 'tis only because thou art young
That blossoms from under the mountain snows appear to thee to have sprung.
There is no grass on the glacier—the blades do not even start;
But thou art in love, and the grass and flowers are springing in thy heart."

Was better expression ever given to the thought that all the world seems fresh and beautiful to one who is young and in love?

Day after day Prince Djordjadzi and I rode from *aoul* to *aoul* through the wild mountain scenery of the eastern Caucasus, sometimes climbing through low-hanging clouds to solitary shepherds' huts on the high mesas, 4,000 feet above the sea; sometimes descending into narrow, gloomy gorges which suggested the canyons of Arizona, and sleeping every night in the flat-roofed stone houses of the fierce, wild but hospitable mountaineers. The state of society in which we found ourselves was as rude and savage in some respects as that which Cæsar found among the barbarians of ancient Gaul, and almost every day we had an opportunity to observe customs and

Photo from George Kennan

A WOMAN OF SOUTHERN DAGHESTAN

Like most of the daughters of Eve, the Daghestan women have a passion for adorning themselves. The profusion of jewelry worn by this woman, the gold bedecked head-dress, the rings on every finger, and, finally, the liberal use of the eyebrow pencil, prove her no exception to the rule.

Photo from George Kennan

A TATAR WOMAN OF SHAMKAL

Among the mixture of races and tongues in the Caucasus the Tatars are well represented. They are found in greatest numbers in northern Daghestan and in the steppes which stretch northward from the mountains. This Tatar woman is wearing her national costume.

A CAUCASIAN COUNTRY DANCE

This is a very odd and striking dance peculiar to the Caratschai in the southern Caucasus. A ring is formed, with the musicians in the center, and the dancers merely jump up and down as the ring moves slowly around. Every festivity opens and closes with this performance, which, to western ideas, is not very suggestive of dancing.

Photo by Vittorio Sella

A DISTANT VIEW OF USHBA

A remarkable feature of the central Caucasus is its luxuriant and abundant vegetation. In the sheltered valleys many of the more beautiful flowering shrubs are found, such as the magnolia, the camellia, and the azalea. Note the number of trees and shrubs in the picture.

Photo by Vittorio Sella

THE BEAUTIFUL PEAK OF USHBA

One of the most beautiful mountains in the central Caucasus is Ushba, which rises to the height of 15,410 feet. Until ten years ago this peak, which is higher than the Matterhorn, had never been climbed.

Photo by Vittorio Sella

A TYPICAL CAUCASIAN CANYON

"These canyon-like ravines are the most striking topographical features of central Daghestan. They are seldom more than 300 or 400 feet wide at the bottom, and are shut in by high walls, which are either sheer precipices or steep slopes broken into narrow, step-like terraces by outcropping ledges of sedimentary rock" (see text, page 1115).

Photo by Vittorio Sella

THE UNBROKEN WALL OF THE CAUCASUS

"Its entire length, measured along the crest of the central ridge, does not much exceed 700 miles; but for that distance it is literally one unbroken wall of rock, never falling below 8,000 feet and rising in places to heights of 16,000 and 18,000 feet, crowned with glaciers and eternal snow" (see text, page 1087).

methods which were apparently survivals from the early ages of the world's history.

HABITS AND CUSTOMS SURVIVING FROM EARLY CHAPTERS OF THE WORLD'S HISTORY

In the houses where we slept, the portholes which served as windows had neither sashes nor glass. Against some of the doors were nailed the bones and shriveled remains of lopped human hands, the ghastly trophies of battle or blood-revenge. Meals were eaten on the floor from a common dish or kettle, out of which every man took his portion with a sharpened pine splinter or a wooden spoon. Fruit was offered to us on huge brass or copper trays bearing Latin inscriptions in old Gothic letters or verses from the Koran in Arabic. Grain was threshed by driving over it a yoke of oxen attached to a wooden toboggan, whose lower surface was studded with sharp-edged fragments of quartz.

Men accused of crimes were tried by the ordeal or cleared themselves by compurgation. Homicide was restrained only by the laws of the vendetta. A murderer who wished to make peace with his blood-seekers let his hair grow long, put on a white shroud, went with uncovered head to the relatives of the man whom he had killed, presented them with an unsheathed dagger, holding it by the point, and took the desperate chance of life or death. Forgiven murderers became members, by adoption, of the clans to which their victims had belonged.

A man who had a quarrel with his neighbor wrapped himself in a burial shroud and went in person to settle it, carrying in his hand money to pay a priest for reading prayers over a grave; and the dead were lamented with keening, borne to the village cemetery on ladders, and buried with Arabic prayers in their hand, to be given to the angel who should awaken them on the morning of the resurrection.

In short, the men whose acquaintance we made and whose customs we observed in the *aouls* of central and southern Daghestan lived, acted, and died in much the same way perhaps that our own ancestors lived, acted, and died on the plains of Asia or in the forests of Europe in the forgotten years of the remote past.

ON ONE OF THE GABLES OF THE WORLD'S ROOF

On the 3d of October we entered the high trough between the snowy range and the main range, spent the night in the Daghestan village of Bezheeta, at an elevation of 8,000 or 9,000 feet, and about the middle of the next forenoon began the ascent of the gigantic ridge which forms the backbone of the eastern Caucasus and which separates Daghestan from the valley of Georgia.

We started up the mountain in zigzags, following as nearly as possible the track of a small but rapid stream which came rushing down from a rudimentary glacier 1,000 feet above. Old, hardened snow soon made its appearance, the noise of the torrent ceased, and we entered a gray canopy of clouds, which hid everything from sight except the *névé* over which we rode. For an hour or two we climbed steadily upward, enveloped constantly in clouds and hearing nothing but the crunching of snow under our horses' feet.

Suddenly a cold, piercing wind began to blow in our faces. We had reached the summit, 12,000 feet above the sea, and the wind came from the other side of the range. The clouds, however, still hid everything from sight, and the mist, wind, and low temperature made it uncomfortable to stay on the summit long.

A VISION OF THE PLAIN

Just before we began our descent, however, the gray ocean of vapor suddenly opened beneath us, and there, 12,000 feet below, lay the beautiful semi-tropical valley of Georgia, like a huge colored map framed in clouds. Scores of glittering streams, like shining silver threads, lay stretched across the broad expanse of meadow land which sloped away from the base of the mountains; orchards, vineyards, and olive groves diversified it here and there with patches of darker green, and far away in the

Photo by Vittorio Sella

IN THE RUSSIAN SWITZERLAND

"It [the Caucasus] is in some respects one of the most remarkable mountain masses in existence. Its peaks outrank those of Switzerland, both in height and in rugged grandeur of outline; its glaciers, ice-falls, and avalanches are all upon the most gigantic scale; the diversity of its climates is only paralleled by the diversity of the races that inhabit it" (see text, page 1087).

Photo by Vittorio Sella

THE VILLAGE OF MUJAL, CENTRAL CAUCASUS

This village, situated in one of the broad open valleys of the central Caucasus, presents a very different appearance to the villages of Daghestan. There the village closely resembles a New Mexican pueblo; here it looks like a collection of medieval castles; there the houses cling in compact masses to the steep sides of the mountains; here they are set, widely spaced, in the rich pasture lands at the foot of the mountain slopes.

Photo from P. G. Gates

A TYPICAL HOPI PUEBLO

This Indian pueblo, perched on the top of a mesa in Arizona, not far from the town of Oraibi, bears an extraordinary resemblance to the mountain villages of Daghestan, both in location and architecture. The close similarity can best be appreciated by comparing this picture with those on pages 1116, 1118, and 1119.

distance loomed the purple, snow-clad peaks of Armenia.

The contrast between the scenery on the northern side of the range and that on the southern side was most extraordinary. Behind us rose the high ridges and terraced mesas of Daghestan, already covered with a white mantle of snow; before us lay the green fertile valleys of Georgia and the Alazan, smiling under a midsummer sun. Behind us, Siberia; before us, Italy, and around us the snow and the clouds of the high Alps.

The view from the crest of the great range, as the clouds gradually blew away, was one of almost unimaginable extent, diversity, and grandeur; but we were so thoroughly chilled that we did not give much time to enjoyment of it, and after drinking a cup of Kakhetian wine and eating a cake or two of unleavened Daghestan bread, we started down the long zigzag trail which led into the valley of the Alazan.

At noon we stood 12,000 feet above the sea, on the old, hardened snow which covered the crest of the main range. At 8 o'clock in the evening we were riding through dark olive orchards and vineyards redolent with the odor of ripening grapes, listening to the monotonous croaking of frogs, and breathing the warm fragrant air of a night in June.

In eight hours we had passed from midwinter to midsummer, and the snowy crest of the main range showed faintly, like a dim streak of white, against the dark blue, star-spangled, trans-Caucasian sky. Just before midnight we reached Prince Djordjadzi's estate and, dismounting from our tired horses, entered the courtyard gate of his spacious, white-walled mansion, in the far-famed valley of the Alazan.

THE MYSTERIOUS LIFE OF THE COMMON EEL

By Hugh M. Smith

United States Commissioner of Fish and Fisheries

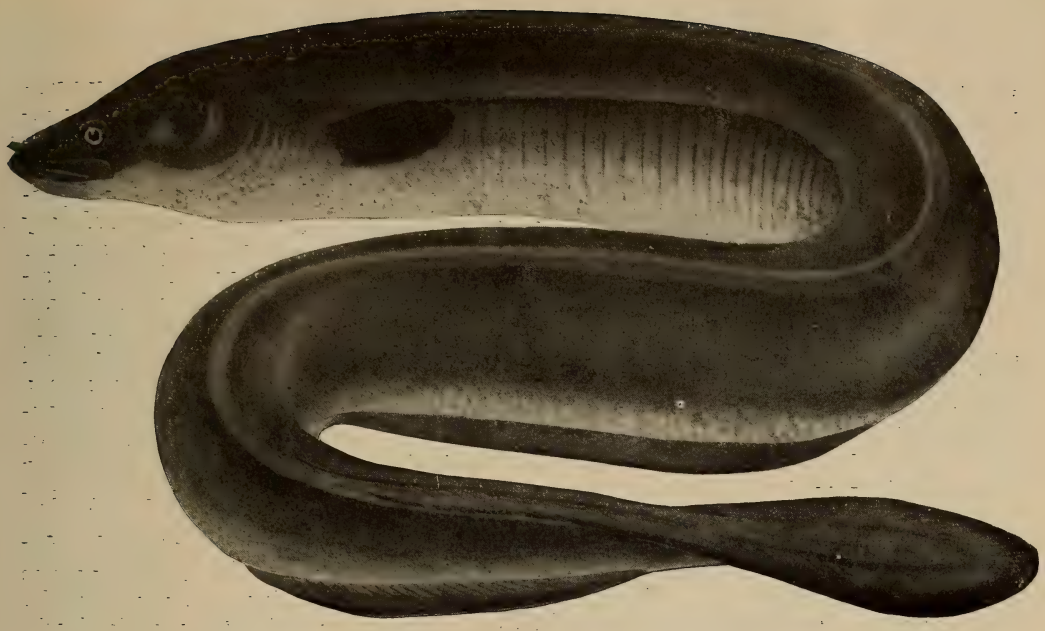
Author of "Oysters: the World's Most Valuable Water Crop," "Our Fish Immigrants," "America's Most Valuable Fishes," "The Pearl Fisheries of Ceylon," "King Herring," "Some Great Fishes of the Sea," "Brittany, the Land of the Sardine," etc., in the National Geographic Magazine.

ONE of the most familiar, but least known, fishes of the United States is the common eel. It reaches the height of its development on the Atlantic seaboard and in the rivers discharging thereon, but is found also in the Gulf of Mexico, and thence to northern Brazil, in the Mississippi River and tributaries, and in the Great Lakes. A very closely related species abounds in western Europe and the Mediterranean Sea, and extends its range to the Azores and Canaries.*

In recent years much attention has been devoted to the study of the eel, and only a few phases of its life now remain obscure. The established facts are in some respects more extraordinary than the fabulous views of ancient and medieval writers and the extravagant hypotheses of some modern investigators. When the complete life of the eel is cleared up, it will doubtless be shown to have a more remarkable history than any other fish possesses.

In the United States the eel, although a valuable food fish, is not nearly so important as in western Europe, particularly in Denmark, Germany, and Sweden,

* Considerable doubt formerly existed as to the relationship of the eels of the two sides of the North Atlantic Ocean. It is now known that they are entirely distinct, one constant point of difference being the possession by the American eel of about seven less vertebræ than the European fish has.



THE COMMON EEL, *Anguilla chrysypa rafinesque*

The common eel, though a most familiar fish, has been surrounded in the past with a wealth of legend and fiction as regards its origin. Now that science has begun to find out how this fish really comes into the world, the story proves to be actually more wonderful than any of the fables previously related (see pages 1141 and 1142).

where it is one of the most esteemed of food fish. The eel catch in all North America is insignificant by comparison with that of Denmark, the smallest coastwise country of Europe. It is therefore not strange that the eel should have received special attention from the biologists and fishery authorities of Scandinavia and Germany, and that recent extension of knowledge of this fish should have come largely from that source.

Study of the eel is not of purely scientific interest, but has a decidedly practical bearing, for no intelligent consideration of eel legislation and conservation is possible without a knowledge of the cardinal points in the eel's life, especially its reproduction, migration, and growth.

SOME EEL MYTHS

While the remarkable habits of the eel remained unknown or defied the elucidation of the early observers, imagination ran riot, fiction and fable were accepted as fact, and the eel was loaded with an incubus of impossible attributes.

The most extraordinary theories and beliefs have been entertained regarding the spawning habits of the eel, from the time of Aristotle to the present day. The cause of all the speculations and misconceptions has been the fact that eels do not spawn within the confines of the continents or where human observation is possible. We may therefore sympathize with the older writers, including Aristotle, Pliny, Athenæus, and Oppian, among the ancients, and Rondelet and Gessner, among the writers of the middle ages, who make no account for the generation of eels in any other way than by spontaneous origin from mud, slime, dew, horsehair, skins of old eels, etc.

One of the most noteworthy writers of eel fiction was Albertus Magnus (1206-1280), who was a student of Aristotle and a teacher of Aquinas, and was the most learned and widely read man of his time. An edition of his works, published at Frankfort in 1545, contains the statement that "the eel comes out of the water in the night-time into the fields, where he can find pease, beans, or lentils."

Sustained by this reputable authority, the eel began to frequent the literary fields of many subsequent writers, in search of vegetable and other land prod-

ucts; and the belief is current among the peasants in parts of Germany today that the eel makes excursions on dry land, more particularly on the approach of a storm. This view, as either an independent or an imported creation, is likewise held in various parts of America.

I was once obliged to combat, in a reputable sporting journal, the contention of an estimable angler that he had demonstrated that the common eel is the male and the lamprey (which is not an eel, not even a fish) is the female of one and the same species. That was some years ago, and popular knowledge of the eel has since then increased; but if a person consults the recent files of sporting magazines and natural history periodicals of a certain kind, he will see how the old errors about the eel persist. As late as the year 1913 it remained for a writer in one of the best of our outing magazines to report that the eel, when a year old, ascends Niagara Falls and thus gains access to the upper lakes.

THE EXTRAORDINARY CHANGES OF ITS LIFE

In the fall the eels which have been living in the fresh waters and have attained their full growth undergo peculiar changes. The eyes in the males become nearly twice the normal size, and both sexes lose their dirty yellow-green color and become silvery. Such eels migrate downstream, traveling mostly at night, and eventually reach the sea, where all trace of them is lost. Their behavior in the sea, the depths at which they swim, their rate of travel, and whether in scattered bodies or in compact schools, are some of the still obscure phases in the eel's life.

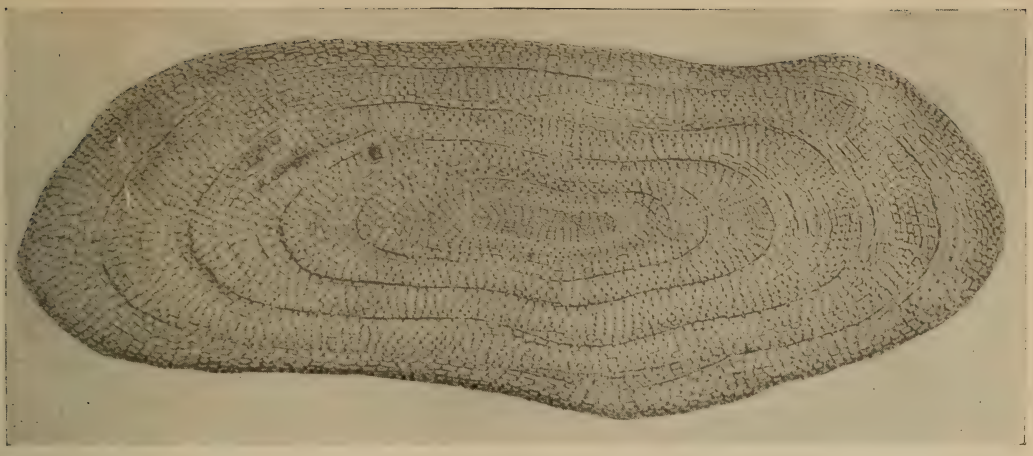
The next evidence of these eels is met with on the high seas, far from land, in the form of their young progeny. The larval eel is such a very different-looking creature from the adult that no person not properly instructed could by any possibility recognize it. It is compressed laterally to the thinness of a visiting card; it has a small head, large eyes, formidable, but apparently non-functional, teeth that project forward and laterally; and the body is transparent throughout, the fish being practically invisible except for its glistening black eyes.

The larval eel, known as the *leptocephalus,* undergoes an extraordinary metamorphosis. It remains at sea for about one year, during which time it attains a length of three inches. Its larval state has then reached its climax, and in its subsequent growth for a time the eel actually becomes smaller! There is a gradual change in form from the ribbon-like to the cylindrical, a shortening of the body and of the intestine, and a gradual assumption of the eel-like appearance (see page 1145).

Fresh water has a great attraction for the young eels, and as soon as they reach the coasts, to which they are wafted by currents and winds, they seek fresh-water streams and begin to ascend them. When they first arrive they have little pigment in their skin, but they quickly acquire a brownish color, and by the time they arrive as far upstream as, say, the vicinity of Washington, they have become quite dark.

Eels at the age when they begin their ascent of the streams are called elvers, a name that appears to have originated on the River Severn in England and has spread to all English-speaking countries where eels are known. The upstream movement of the elvers is known as an eel-fare on the Severn, Thames, and other English rivers, and this name also has been transferred to America and other countries. "Fare" is from an Anglo-Saxon verb meaning "to go" or "to travel," and "elver" is a corruption of eel-fare. The migration, coming in late winter or spring, may last for a few days or several weeks in a given stream, and the young, closely skirting the shores, may be in a practically unbroken column during the entire period.

Some eels remain in the lower parts of the streams and move back and forth in the bays and estuaries, and others press on to the headwaters, often surmounting obstructions that would be impassable for other fish, and remain there until full maturity is attained.



SCALE OF AN ADULT FEMALE EEL

The eel was on her way to the sea to spawn when caught in the Potomac River. The age, according to the evidence afforded by the scales, was over eleven years (see page 1144). Enlarged 25 times.

HOW THE EEL IS BORN AND WHERE

The habits of the eel at the time of spawning are entirely unknown. Whether the eggs are laid in deep water, in intermediate depths, or at the surface is as yet only a matter of surmise. It is established, however, that the eggs are deposited outside of the 1,000-meter curve (that is to say, the eggs are never deposited in water less than 1,000 meters deep), and that they hatch at or near the surface, where they are carried by their natural buoyancy.

Up to the present time no eel with ripe eggs has been found, and only one fully mature male has been observed, a specimen 35 centimeters (14 inches) long, recently taken on the coast of Denmark.

From counts and estimates based on immature specimens, it is evident that the eels are the most prolific of all fishes and of all backboned creatures. From 5,000,000 to 10,000,000 eggs are probably produced by the average-sized eels, and 15,000,000 to 20,000,000 must be deposited by the largest examples. A specimen one meter long and weighing 2.6 kilograms, taken in the Potomac River in November, 1912, while migrating to the sea, contained approximately 15,000,000 eggs from 0.23 to 0.37 millimeter in diameter.

All large eels are females, and only females enter conspicuously into the market supplies in either America or Europe. Any eel over 40 centimeters (16 inches) long is likely to be a female and one over 45 centimeters (18 inches) is almost certain to be a female.

All eels found in the headwaters of large streams are females. The males remain in the lower courses of rivers and as a rule do not go above tidewater. One of the most surprising facts in the eel's life is that all individuals of both sexes die after spawning once. No "spent" eels have ever been found; no mature ones have ever been seen coming in from the sea, and, as a matter of fact, no provision is made by nature for the return to the fresh waters of any of the myriads of eels that go down to the sea each year to spawn.

Just what becomes of the eels after spawning is not known. The conger eel, a strictly marine species, undergoes a general degeneration or jellification of its tissues after the spawning act, and it is supposed that the common eel meets with the same fate. The writer once had served to him at an inn on the east coast of Japan a common eel that was peculiar in having a gelatinous consistency throughout. The specimen had been brought in by fishermen operating offshore in deep water, and may have been a spent fish in process of disintegration.

LARVAL EELS IN THE NORTH ATLANTIC

Larval eels have been collected all the way across the North Atlantic, from 25° to 45° north latitude. Much new material of a very interesting character was obtained in 1910 by Sir John Murray and Dr. Johan Hjort during their notable cruise in the Norwegian government steamer *Michael Sars*. The larval eels, or *leptocephali*, as they are scientifically known, frequent the surface waters, and may be caught in large, fine-meshed tow nets. They possess very feeble swimming powers, and it is evident that their movements are controlled largely by tides and currents. The smallest specimens are found in mid-ocean south of the Azores, which is the spawning ground for the European eel and probably also for the American eel. It is not easy to understand how the American eel, in the course of its metamorphosis, reaches the shores of the United States and Canada, but it is clear that the Gulf Stream carries the European species to the coasts of western Europe. As the coasts of the continents are approached, the larvæ average larger and larger; none are ever found near land that are as small as all of those taken in the Sargasso Sea.

The *leptocephali*, or larval eels, approach the shores of Europe in three great bodies, corresponding with the drift currents from the Gulf Stream; one mass goes to and around the northeast coast of the British Isles, another to the English Channel and Bay of Biscay, another to the region of Gibraltar, and thence into the Mediterranean Sea.

One of the most surprising of the recent discoveries about the eel relates to the Mediterranean. For many years the only knowledge we possessed about the larval shapes of the eel came from that sea. In 1856 a larval fish was described by Dr. Kaup from the Strait of Messina, which for many years was the only place in Europe where such fish were found.

It was forty years later (1895) that the Italian investigators Grassi and Calandruccio identified Kaup's fish as the larval form of the common eel. No eggs and no very young stages of the eel have, however, been discovered in the Mediterranean; and Dr. Schmidt, the well-known Danish investigator, has recently concluded that the common eel does not spawn anywhere in the Mediterranean, and that the entire stock of eels in that sea comes from the Atlantic.

One of the strangest facts about the larval eels is that they take no food. Here is a vertebrate animal, emerging from an egg less than one-twenty-fifth of an inch in diameter, growing to a length of three inches in perhaps a year, buffeted about on the high seas, and drifting over a distance of 1,000 miles or more, and yet during this entire period taking no food whatever, and doubtless incapable of doing so, owing to the unprepared condition of its digestive organs. Similar cases occur in other fishes and among insects and other animals; but there must be few, if any, which afford a parallel to this.

EEL SCALES AND WHAT THEY SHOW

To laymen and fishermen alike the eel is a scaleless creature; to them its smooth, slippery skin gives no evidence of the scales of extraordinary development and interest that are well known to the biologist.

While the scales of an eel are small and inconspicuous compared with those of many other fishes, they may easily be made out, with the unaided eye, by a careful examination of any part of the skin. They may be recognized by their parallel arrangement in small clusters, which in turn are disposed at right angles to one another, so that the entire skin has a minute cross-hatch appearance.

The scale of the eel has come in for a large amount of study in recent years. This study, like that of fishes' scales in general, has thrown much light on the age, growth, and habits of the eel, and has furnished important data that could not have been obtained in any other way.

Eel scales are thin, flat, elongate-elliptical bodies, very different in character from those of any other American fish. They consist of a base surmounted by minute, refractive, elliptical elevations, arranged in regular concentric series.

The scales participate in the growth of

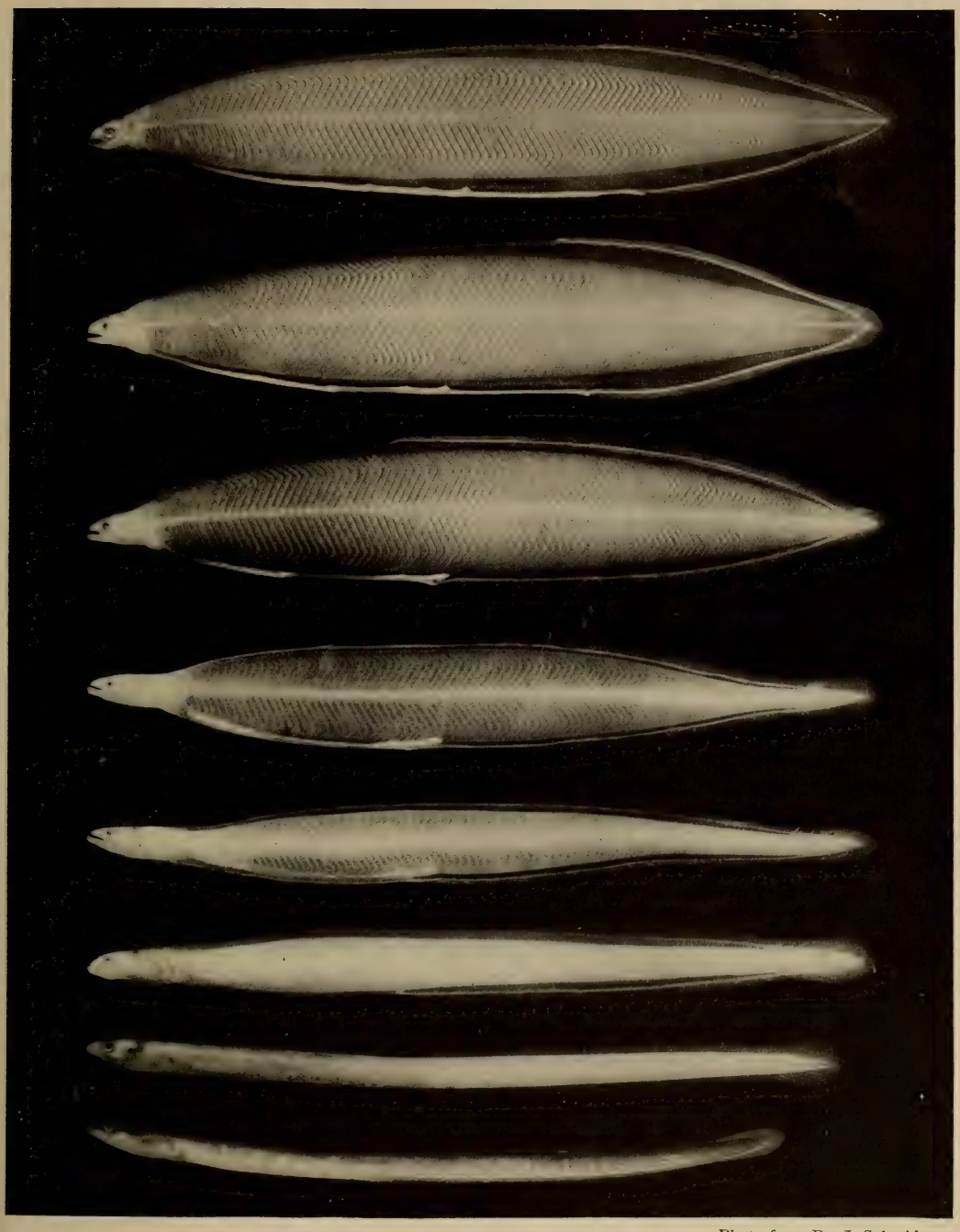


Photo from Dr. J. Schmidt

THE REMARKABLE METAMORPHOSIS OF THE COMMON EEL, FROM THE FULL-GROWN LARVAL EEL (*Leptocephalus*) TO THE ELVER

The top figure is that of a larval eel which has attained its full growth. It is as thin as a visiting card, quite transparent, and about three inches long. It gradually decreases in size and, as time goes on, gets rounder and rounder, till it finally attains the characteristic shape of the eel, changing from what might be termed a pancake into a serpent form. During this period, of about a year in length, it takes no food whatever, yet it drifts from the breeding grounds in mid-Atlantic over 1,000 miles to the entrance of its future fresh-water home (see pages 1142 and 1144).

the fish, and increase in size by accretions of new matter around the margin; these accretions are in concentric zones like the rings of a tree. When the growth of an eel ceases or is reduced, as in winter or during a prolonged fast, there is a corresponding discontinuity or decrease in the deposition of new matter on the margin of the scales, and such periods of arrested growth are permanently marked and enable the student to compute the exact age of eels.

Scales are not normally deposited until eels have passed three years in fresh water; they form first near the middle of the side, and may not appear on the head until two years later. Consequently, in determining the age of any given specimen of eel by its scales, the side scales should be those first deposited, and allowance should be made for the scaleless life (3 years) and the period spent at sea after hatching (1 year).

DESTRUCTIVE HABITS OF THE EEL

However much we may be interested in the extraordinary habits of the eel, and however much we may extol its food value and economic importance, we cannot ignore its injurious relations to other fishes.

The eel is not a fighter and beats a retreat when attacked by fishes of even much smaller size than itself. It is not destructive to fishes in the way that many of our best game and food fishes are, but it preys extensively on small fry.

The principal damage done by the eel, however, is to the spawn of food fishes. This is consumed in great quantities, especially at night. The shad and herring are among the principal sufferers. The eel, like the human species, has acquired a taste for shad roe, and in the exercise of this propensity it at times comes into serious conflict with the fishermen of some of the Atlantic rivers.

Many years ago it was noted by Prof. Spencer F. Baird, Commissioner of Fisheries, that the eel is an undesirable inhabitant of streams in which fish are caught by means of gill nets; and that there is a large destruction of shad and herring in the Susquehanna and other streams to the southward, where it is a not infrequent experience of fishermen to find, when their nets are hauled in, that the greater part of the catch consists simply of heads and backbones, the remainder having been devoured by eels in a short time, while spawning shad caught in gill nets are sometimes found completely emptied of roe.

A curious experience, referred to by Professor Baird and noted also by more recent observers, is for a fisherman to find a shad, apparently in full roe, to contain an eel or several eels which have entered the vent, destroyed the eggs, and ensconced themselves in the abdominal cavity of the shad.

OUR ARMY VERSUS A BACILLUS

By Alton G. Grinnell

IN ALL the history of human endeavor nothing compels greater admiration than the devotion of a lifetime to the conquest of a world-wide disease. It is seldom, if ever, given to one individual to search out single-handed the cause of the disease, demonstrate to humanity how it is communicated, and show how it may be prevented. In such a monumental achievement the ultimate success is usually due to the researches and experiments of many men, all of whom have been actuated by an ambition to relieve human beings of unnecessary suffering.

The details of the first act of such a drama are usually obscure, and even if known to the public are uninteresting at the time because of their technical character and apparent lack of connection with human ills.

But when the years of experimentation have passed and the marvelous thing is demonstrated, with all the world the stage, men wonder at the transformation.

Typhoid fever, which before 1908 had

been fought with every weapon known to modern science and still lurked in every community, is now put to rout in open combat by the aid of its own dead bacteria. The illuminating light of discovery makes possible the immunization of an army of 85,000 men against a disease which is more prevalent in this country than in most civilized countries and causes a yearly loss of something like $350,000,000 and untold suffering—a disease which has been the scourge of our army and has killed and maimed more than powder and shot. This same disease was directly responsible for an outlay of $20,000,000 in the British South African war, and has been the cause of great suffering and financial loss for many years among all peoples in every climate, in peace and in war.

A SERIES OF DISCOVERIES

Scientists of many nations have contributed to the campaign for the eradication of typhoid, but to the United States Army belongs the credit for the first practical demonstration on a large scale. From the discovery of the germ to this remarkable demonstration was a span of 31 years, wherein the following important contributions were made:

(1) Eberth, a German bacteriologist and anatomist, discovered the typhoid germ in the year 1880. It belongs to that group of bacteria which live on live animal and vegetable matter and is known as a parasite. Twelve thousand of them placed end to end would measure only one inch. They multiply very rapidly under favorable conditions, dividing into two about every 40 minutes, which in the course of 24 hours would result in the production of millions but for the lack of sufficient food.

They cannot develop in intermediary hosts, such as fleas, mosquitoes, etc., like certain other micro-organisms; but they can exist for several months in various substances, and thus be transmitted from one person to another. Fortunately, the sunlight destroys them in from four to eight hours.

After being taken into the mouth in food or drink or on the fingers, the germ finds its way into the intestines, whence it is carried by the blood to all parts of the body and produces a poison known as the typhoid toxin, which affects the tissues and organs in such a manner as to cause the symptoms of the disease.

(2) Dr. Ehrlich, a German scientist, advanced the theory that besides the poisonous toxin another substance is formed in the body, as the result of the invasion by the typhoid bacilli or other germ, which is antagonistic to it and is known as its anti-toxin.

(3) In 1884 the great Russian scientist Metchnikoff advanced the theory that the function of the microscopic cells, the white blood-corpuscles, which are found in great numbers in all parts of the body, is to act as policemen of the blood, and that it is due to their eternal vigilance that disease germs in the blood, such as the typhoid bacilli, are destroyed. He calls these microbe-eaters "phagocytes." Certain diseases, such as typhoid fever, smallpox, plague, etc., practically never attack the same individual twice, because these defenders have become so active (energized) in their efforts to overcome the germs during the first attack that they remain in this active state indefinitely.

WRIGHT INTRODUCES PREVENTATIVE VACCINE

(4) As the result of the work of Sir Almoth Wright, an Irishman, the two theories above were united to explain the resistance of the body to disease. He showed that the substance mentioned by Ehrlich first attacks and sensitizes the foreign organisms in the body, and that the white corpuscles then absorb and carry them away.

A most remarkable exhibition of this functioning is now given to the public by means of moving pictures, a film having been prepared by a French scientist and exhibited by MM. Pathé Frères which "shows the white corpuscles of the blood gradually altering their shape and position and fulfilling one of their best-known functions as scavengers and absorbing such abnormal substances as microbes, disease-cells, and granules of inert matter."

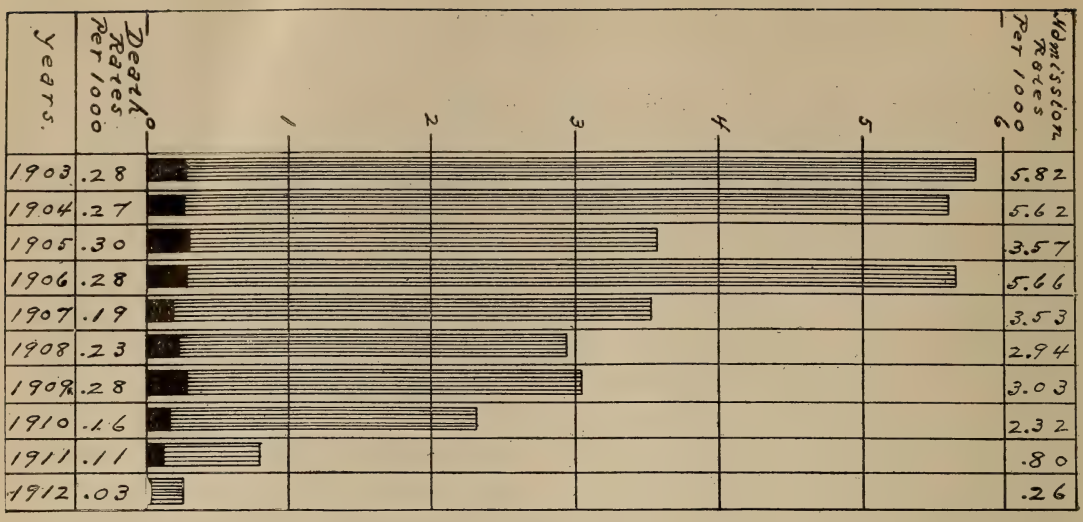


DIAGRAM SHOWING PERCENTAGE OF TYPHOID FEVER CASES AND DEATHS IN THE UNITED STATES ARMY, 1903-1912

Anti-typhoid vaccination, begun voluntarily in 1909, was made compulsory in 1911. Up to the end of September, 1913, there had not been a single case of typhoid fever in the United States Army in 1913 (see page 1150).

These facts being known to science, experiments were made to produce anti-typhoid vaccines, which when injected into the blood would have in a mild degree the same effect upon the body tissues as the disease germs.

(5) The French scientist Pasteur made the first successful experiments, in the immunization of chickens against cholera, which led up to the immunization of man against typhoid. His experiments were conducted solely upon animals. Others continued his researches.

(6) Later Sir Almoth Wright demonstrated that the dead bacteria of typhoid could be made into a preventive vaccine, and in 1897 he published a report of the first 20 anti-typhoid inoculations on human beings.

HOW THE WORK IN AMERICA BEGAN

(7) The scene now shifted to the United States. One autumn afternoon in the year 1908 there assembled in the office of the Surgeon General of the Army a group of distinguished physicians and surgeons:

Brig. Gen. R. M. O'Reilly, Surgeon General; Drs. Victor C. Vaughan, William T. Councilman, John H. Musser, Alexander Lambert, Simon Flexner, William S. Thayer, and Capt. Frederick F. Russell, Medical Corps, U. S. A.

With the exception of the Surgeon General and Capt. F. F. Russell, this army board was made up of members of the "Reserve Corps."

The Surgeon General addressed the scientists present, stating why they had been brought together, and set forth briefly the history of typhoid in the United States Army up to that time. Had we been present we would have learned that typhoid fever exacted a toll in the northern army during the Civil War of 80,000 cases, and was the cause of not less than *86 per cent of the total mortality* of the American Army in the Spanish War of 1898, there having been 20,738 cases, with 1,580 deaths, among a total of 107,973 men.

The lessons of the latter war and subsequent investigations had made possible many advances in sanitation, and the medical department of the army was bending every effort toward the eradication of the disease. The number of cases per year had finally been forced down to about 300 in the army in the United States, but the ever-present "carrier" (an individual who is apparently not sick of the disease, but still harbors the germs in his system and is capable of imparting them in virulent form to others) was elusive; also typhoid was flourishing quite generally in the civil

population of the United States. In this country the *Bacillus Typhosus* was attacking a half million people every year, and 35,000 to 40,000 died of the disease. The utmost endeavors of the health departments were inadequate to eradicate it.

The Surgeon General now called for the report of Captain Russell, who had spent three months in Europe, by order of the Secretary of War, studying the method of immunization used by Sir Almoth Wright. It set forth with scientific accuracy the details of typhoid vaccination as practiced abroad, and stated that although the measure had not met with universal favor it had been reasonably successful, and recommended its adoption experimentally in our army among those who would volunteer.

TYPHOID VACCINATION INTRODUCED IN THE U. S. ARMY

After some discussion, the board unanimously recommended the adoption of anti-typhoid vaccination in the army as a voluntary measure. Backed by the recommendation of these distinguished gentlemen and the authority of the Secretary of War, the Surgeon General took immediate steps to start experimental vaccination and placed Captain (now Major) Russell in charge of the work.

Within a couple of months he had developed an improved technique, so that the reactions which had been somewhat severe before were now quite mild. All the medical officers, their families, many commanding officers, and the Hospital Corps immediately submitted to this procedure, in order to set a good example, and the volunteers came forward from the regular army in such goodly numbers as to reflect credit upon the service.

During 1909 and 1910 about 18,000 men were vaccinated. The results were so good that upon the mobilization of the troops on the Texas border in 1911 the Secretary of War ordered the compulsory vaccination of all the troops in the field—the first time in the history of anti-typhoid vaccination that it had been made compulsory; the first test on a large scale of this method of individual protection against the disease which had been the terror of our army camps. The details of this crucial test are imperative to a proper comprehension of the immense value of anti-typhoid vaccination as a prevention against the disease. In an article entitled "The Sanitary Record of the Maneuver Division," Col. J. R. Kean, in charge of the Sanitary and Statistical Division of the Surgeon General's office, states as follows:

"The immense advance in camp sanitation, and particularly the value of this protective measure, can be estimated by comparing the typhoid incidence of this camp with that of the 2d Division, 7th Army Corps, which was organized at Jacksonville, Florida, about June 1, 1898, and remained there in camp until October, some of the regiments leaving in September. This division was not conspicuously unfortunate in its typhoid record for that time and is selected because of the close similarity of its conditions of service to those of the Maneuver Division. The two divisions were encamped in nearly the same latitude and for about the same time; each had a good camp site and an artesian water supply of unimpeachable purity. While the period in camp of the 2d Division, 7th Army Corps, was later in the year, the number of men involved is larger for the Maneuver Division.

SOME VERY REMARKABLE FIGURES

The following table shows the typhoid incidence in the two camps:

Mortality and morbidity from typhoid fever in the 2d Division, 7th Army Corps, at Jacksonville, Florida (June-October, 1898):

Mean strength	10,759
Cases of typhoid, certain and probable	2,693
Deaths from typhoid	258
Deaths from all diseases	281

Compare these figures with those for the Maneuver Division, San Antonio, Texas, March 10 to July 11, 1911:

Mean strength	12,801
Cases of typhoid, certain and probable	1
Deaths from typhoid	0
Deaths from all diseases	11

"This is the more remarkable when it is stated that the average typhoid rate at the army posts in the United States during the same period was 34 per 1,000;

in other words, the health of these soldiers in camp, sometimes living in deep mud and at other times in clouds of dust and under a semi-tropical sun, was better than in barracks surrounded by the comforts and sanitary appliances of post life."

Further proof of the many opportunities which the soldiers had to contract typhoid is given in Major Russell's report:

"There is no doubt but that the hygiene and health of the men received almost ideal care; the difficulty was, however, that the men were not confined to camp, but had liberty and opportunity to visit the neighboring cities of San Antonio and Galveston. Thousands spent more or less time in these cities, where they dined and lunched, and drank and slept; in fact, became, for the time being, a part of the community.

"In Galveston, especially, where a ten minutes' ride carried one from the camp to the heart of the city, the number of men visiting town was large. The soldier always has a good appetite, and he drank and ate everywhere—in good restaurants and bad, in the numerous lunch-wagons, and at street-corner stands. Fruits and pies and sweets in enormous quantities were purchased from hucksters lined up along the camp boundaries; they even invaded the company streets, carrying their various sorts of indigestible and infectious products from tent to tent. The best kind of camp sanitation could not keep down typhoid in the presence of all these possible chances of infection, if typhoid existed to any extent among the local population.

"During this period of four months there were reported to the health office 49 cases of typhoid, with 19 deaths, among the civil population of the city of San Antonio, and in Galveston 192 cases were recorded during the same period. These two cities can therefore serve as controls and indicate what might have happened to our troops in the absence of vaccination.

AN IMMUNIZED ARMY

"Aside from the sources of infection in the adjoining cities, we must believe that the men were also exposed to the influence of an unknown number of chronic bacillus-carriers among our own men. There is every reason to believe that among 18,000 men there were one or more carriers in each regiment, yet they spread no disease, and one of the most important conclusions to be drawn from our recent experience is that *in vaccination we have the only effective protection against the elusive carrier.*"

Complete confidence in vaccination was established by this epoch-making achievement, and, upon the recommendation of the Surgeon General, the Secretary of War ordered, on September 30, 1911, the compulsory vaccination of every person in the army under 45 years of age, and of all recruits. This was carried out as promptly as possible, and, as the result, the United States has today an "immunized" army, *not a single case of typhoid having thus far been reported among the troops in this country during 1913.* This record, compared with that of any year previous to the beginning of vaccination, seems little short of miraculous.

In no other army is anti-typhoid vaccination mandatory, and no other is entirely immunized against the disease. Our navy soon followed the precedent established by the army, and it is today immunized with vaccine prepared in the laboratory of the Army Medical School.

SOME FIGURES THAT PROVE

In a paper recently read before the Congress of American Physicians and Surgeons in Washington, Major Russell included a table showing the incidence of typhoid in the army in the United States during the period 1903-1913. These statistics were gathered with the utmost accuracy and tell the story in a nutshell:

Typhoid Fever, U. S. Army, in the United States

	Cases
Five years prior to 1908 (average per year)	160
Two years after vaccination had begun (year 1911)	44
Three years after vaccination had begun (year 1912)	18
First nine months of 1913 (latest figures available)	0

Since 1908 a prodigious amount of work has been accomplished. The vari-

ARMY SURGEON VACCINATING NEW RECRUIT AGAINST TYPHOID FEVER

ous steps in the production of each dose of vaccine have been as carefully regulated and supervised as though it was to be used upon the President of the United States. Before leaving the laboratory, it is tested upon guinea pigs, and the statistics above quoted show the results of this painstaking care. Large quantities have been furnished to the various government departments, to the militia, and to a number of civil institutions.

As soon as its success was assured the larger drug firms of the country sent representatives to Washington to learn the formula and to study the process of manufacture. The same vaccine is now prepared by these firms and sold to the medical profession of the country at a reasonable rate.

Regarding the act of vaccination itself, an authority states:

"It is quite simple, consisting merely in the subcutaneous administration, with a hypodermic syringe, of a small quantity of the opalescent prophylactic fluid. The syringe is sterilized by boiling, the skin is prepared by painting a place on the arm the size of a quarter, and the immunization is completed by the administration of 3 doses—the first containing 7½ drops and the second and third, which are given 10 and 20 days later, 15 drops each. The site of inoculation becomes somewhat red and tender for a day or two, but there is no sore and no scar as in vaccination against smallpox.

"In a small percentage of cases, less than five, there is some headache and prostration, but it soon disappears, rarely lasting more than 24 or at the most 48 hours. In this connection it is necessary to remember that we vaccinate none but the healthy."

The progressive health department of New York city decided to use the typhoid prophylactic as soon as its success was assured by the War Department, and it is every day being more generally used throughout the country among those who come in contact with the disease or are traveling in areas known to be infected. Miners, campers, contractors, and all who are removed from the safeguards of sanitation in a modern

community find it the surest and most convenient means of protection.

WHAT HAPPENED IN THE RECLAMATION SERVICE

The United States Reclamation Service decided to use the typhoid prophylactic early in the year among its field force, which is scattered over a large area in the West. It was not made compulsory, but circulars were sent to the various camps describing the treatment and the results obtained in the army. One of the circulars contained the following ingenious pronouncement:

Typhoid fever can be prevented.
You can aid by being vaccinated.
Prevention beats the physician and undertaker.
Healthy persons may have typhoid tomorrow.
Only those vaccinated or who have had typhoid are immune.
Immunity lasts three years.
Don't hesitate. Volunteer today.

Over 500 persons volunteered for the treatment. Shortly after this an epidemic of typhoid fever broke out in the town of Malta, Montana, most of the cases developing in a hotel, where four of the Reclamation Service men were taking their meals. Of these four one had refused to be vaccinated, one had had typhoid fever, and two were immunized by vaccination. The unvaccinated man contracted a severe case of the disease, the other three escaping. The sequel was that the townspeople made arrangements to secure a supply of the vaccine.

The recent illness from typhoid of the third baseman of the Washington baseball team (which resulted, some assert, in the loss of a pennant) calls attention to the importance of immunizing all professional baseball players. The vaccination of all school children is especially recommended, as they bear the treatment rather better than adults.

SOME PROPER PRECAUTIONS

As the typhoid bacillus can live but a limited time in water, soil, and other substances, it is obvious that if new pollution is not added from time to time epidemics will be prevented. The general use of the prophylactic will, probably, extinguish the disease, since the vaccination of an entire community absolutely prevents the "carriers" and all others from giving off the typhoid bacilli, and the focus from which new infection would ordinarily radiate is eliminated.

A BOYS' SCHOOL IN SIBERIA

The pupils in this school are all Tatars and members of the Bouriat tribe; in religion they are Buddhists. The national costume, which the Bouriats have preserved very jealously, consists of a robe shaped not unlike a dressing-gown and usually lined with fur; it reaches to the ankles, and on the right side is embellished with a curious triangular decoration of a different color to the rest of the robe. The men, boys, and unmarried girls have sleeves of the same material as the robe, but for the married women the sleeves are always of a different color or material. The Bouriats are an intensely conservative tribe and view with suspicion any reforms the Russians attempt to introduce.

IN THE MARKET OF HA-NOI

Ha-noi is the capital of Tonkin and the seat of the governor of French Indo-China. Its inhabitants are mainly Annamese, but its trade is in the hands of Chinese and Europeans, and rice, sugar, pepper, and silk are exported in considerable quantities. The native market is a picturesque place, and the quaint costumes, especially the enormous hats worn by both men and women, add variety to the scene. As in other native markets the world over, there is no lack of children.

A GROUP OF LOLO WOMEN AND GIRLS

This group of Lolo women was taken on the borders of China and Tibet. The Lolos are divided into the Black Lolos and the White Lolos, but the terms have nothing to do with the skin of the people bearing them. The White Lolos are those who live on the plains and coasts of Yunnan, while the Blacks are those who inhabit the mountains of the Tibetan border. Both divisions of the Lolos have found the rule of the Chinese by no means to their liking, and, being the original inhabitants of Yunnan, have resisted to the best of their ability. The people of the coast and the plains, being brought into closer contact with the Chinese than their brethren in the mountains, have gradually accepted Chinese civilization customs, but the Black Lolos of the mountains have offered, and still offer, stubborn opposition. Hence the Chinese call them Black.

THE "ROCK OF THE SAIL"

This rock is situated in the Wallis Archipelago, a group of small islands under French control, lying to the northeast of the Fiji Islands. The rock from a distance has the appearance of a sail of a bark that is running before the wind, and the small tree growing at the top completes the illusion of a mast, the smaller branches being invisible a little way off. Owing to its curious shape, the rock is a source of danger to mariners and is marked on all maps and fully described in nautical handbooks.

VOL. XXIV, No. 11 WASHINGTON NOVEMBER, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

THE NON-CHRISTIAN PEOPLES OF THE PHILIPPINE ISLANDS

With an Account of What Has Been Done for Them under American Rule

BY DEAN C. WORCESTER

SECRETARY OF THE INTERIOR OF THE PHILIPPINE ISLANDS, 1901-1913

Author of "Field Sports Among the Wild Men of Luzon," with 54 illustrations, published in the March, 1911, number; "Taal Volcano and Its Recent Destructive Eruption," with 45 illustrations, published in the April, 1912, number, and "Head-hunters of Northern Luzon," with 103 illustrations, published in the September, 1912, number of the National Geographic Magazine.

THE non-Christian peoples of the Philippine Islands constitute approximately an eighth of the entire population of the islands. The territory which they occupy or control comprises an immense region in northern Luzon,* all but a narrow coastal strip in Mindoro, all but a few small isolated regions along the coast in the great island of Palawan, the whole interior and a considerable part of the coast region of Mindanao, extensive areas in southern Luzon and in Negros and Panay, as well as the islands of Basilan, Jolo, Siassi, Tawi Tawi, Balabac, Cagayan de Jolo, and the very numerous adjacent small islands. It is not too much to say that at the present time approximately half of the territory of the Philippine Islands is inhabited by them, so far as it is inhabited at all.

I desire to bring home to the readers of the NATIONAL GEOGRAPHIC MAGAZINE some of the more essential facts as to the division of the non-Christian inhabitants of the Philippines into really distinct peoples, and to this end I shall summarize briefly some of the important known characteristics of each, illustrating my statements, when practicable, with reproductions of photographs taken either by the government photographer, Mr. Charles Martin, or by myself. Typical individuals, houses, settlements, and scenes are shown, so that the reader obtains at a glance facts which it would be impossible to state in words within the limits of any publication smaller than a bulky monograph. In order to facilitate reference, I shall take up the several tribes in alphabetic order. In the latter part of this article, pages 1240 to 1256, an account is given of what has been done for these peoples under American rule.

* There are probably no regions in the world where within similar areas there dwell so large a number of distinct peoples as are to be found in northern Luzon and in the interior of Mindanao.

All of the native inhabitants of the Philippines are assignable either to the black race (the Negrito peoples) or to the brown race (the peoples of Malayan origin). So far as concerns the latter, it should be added that the original Malay blood has in many instances been materially modified by intermarriage with Negritos, Mongolians, or Caucasians, although a considerable number of the mountain tribes have intermarried little with Negritos, less with Mongolians, and with Caucasians hardly at all. Indeed, among the Bontoc Igorots in the earlier days, when motherhood was sometimes forced upon the women by white invaders, it was the custom promptly to kill the resulting *mestizo* children.

I have already described the Negritos, Ilongots, Kalingas, Ifugaos, Bontoc Igorots, and wild Tingians in the September, 1912, number of the NATIONAL GEOGRAPHIC MAGAZINE, devoting special attention to their head-hunting customs; but as the convenience of having even brief descriptions of all Philippine non-Christian tribes included in one article seems obvious, I venture here to record some additional facts concerning these peoples, and to restate some few of the facts already set forth.

Incidentally, I give a few references to important publications, from which those who care to pursue the subject further can obtain many additional details.

THE ATÁS (SEE PICTURE, PAGE 1167)

This designation is derived from a word meaning "high" or "on top of" and is applied to the members of a numerically rather unimportant group of people inhabiting high mountains in the interior of Mindanao back of the town of Davao.

We are still indebted to Jesuit missionary priests for practically all the reliable information which we have concerning these people, and it is meager indeed. The Jesuits say of them, "The Atás inhabit the regions about Mount Apo and to the northwest. They are of a superior type, and this is especially true of their chiefs, who have aquiline noses, thick beards, and are tall. They are very brave and hold their own with the Moros. Their probable number is 8,000."

While I am inclined to doubt the propriety of ranking these people as a distinct tribe, as this has heretofore been done, and as I myself have seen them but once, I here provisionally adopt the decision of others who have had better opportunities for investigation (see photo, page 1167).

THE BAGOBOS (SEE PICTURES, PAGES 1161 TO 1163)

The people of this interesting tribe, who are said to number some 12,000, are confined to the district of Davao, in Mindanao, and more especially to that portion of it in the vicinity of Mount Apo. They are strong, robust, and relatively tall, reaching a height of 1,750 millimeters (roughly, about 5 feet 9 inches). Many individuals are quite noticeably light-colored. Their hair is not infrequently wavy or slightly curled. The Jesuits say of them that "their profile is effeminate, the boys and girls being indistinguishable and the latter having the vigor of the former." Not only is this true, but I have noted that visitors in looking over my collection of photographs very commonly mistake Bagobo men for women.

The dress of the Bagobos is especially striking. The cloth which they use is woven by them from carefully selected and dyed fibers of Manila hemp, and is subsequently treated with wax in such a way as to make it very smooth and durable. The subdued colors of this cloth produce a pleasing effect, and it is ornamented in a most tasteful manner with elaborate bead and mother-of-pearl work. The men wear short, long-sleeved jackets, often elaborately ornamented, trousers which do not reach quite to the knee and have beadwork around their bottoms, kerchiefs or turbans on their heads, and sashes or girdles at the waist, into which are thrust their war-knives, in peculiarly shaped double-pointed sheaths. These sheaths are often elaborately ornamented with beadwork and with horse-hair plumes (see page 1161).

When a man has killed others, he wears on his head a kerchief of reddish-chocolate color ornamented with characteristic almost rectangular white markings, made by tying knots in the cloth before it is dyed. The edge of this kerchief is usually ornamented with beads, and it is worn with one point hanging down over the forehead of the owner. Light-colored straight lines extending across this point are said to indicate the number of his victims.

CURIOUS EAR ORNAMENTS

In addition, the men commonly wear behind, suspended from their shoulders by thongs which pass under their arms, bags highly ornamented with beadwork. The men are also especially fond of a peculiar ear ornament consisting of an immense disk of ivory two or more inches in diameter, connected with a second and somewhat smaller disk by a neck-piece and resembling an enormous collar-button with a short shank (see page 1163). The smaller disk is thrust through a great opening in the lobe of the ear and the flesh contracts about the shank, holding it securely in place. Such an ornament may be worth one or more carabaos, according to its size, and when a man is so fortunate as to own two ivory disks he usually also wears bead necklaces connecting them.

The offensive weapons of the Bagobos are well-shaped lances and heavy knives. For defense they use large wooden shields of characteristic form, which are often quite elaborately carved (see page 1162).

The women wear upper garments and skirts which very effectively cover their bodies. Their arms, and sometimes their ankles as well, are loaded down with ornaments fashioned from brass and from the shells of giant clams. They are very fond of small bells, which are worn around their waists and legs suspended from bead pendants. While they do *not* have bells on their toes, they are abundantly supplied with rings on their fingers, and certainly have music wherever they go (see pages 1161 and 1163).

HUMAN SACRIFICE PRACTICED

The Bagobos live in small villages, ruled by chiefs called *datos*. They are relatively industrious agriculturists. Some of them own quite extensive hemp plantations and have accumulated considerable wealth. A number of American planters have employed Bagobos as laborers and have found them satisfactory.

In the past the people of this tribe have taken and kept slaves, and have habitually indulged in human sacrifices when things were going wrong with them. In fact several such sacrifices have been made since the American occupation, the simple-minded participants admitting the fact readily enough and being quite surprised that any one should take exception to a custom believed by them to be not merely proper but highly commendable.

They have until recently carried on intermittent warfare with neighboring tribes and to some extent among themselves, but are now living quietly and peaceably.

They are a music-loving people and fashion some large and beautifully ornamented stringed instruments. Some of their dances are most attractive. I have known a professional Bagobo teacher of music and dancing.

Much time has been devoted by several competent observers to the study of the Bagobos, and when the results of their observations are published we shall know much more about the people of this tribe than we do at present. They are certainly in many ways most interesting and attractive; but the custom of making human sacrifices, which they share with the Manobos, does not commend itself to the average American. This custom alone affords adequate ground for separating them from nearly all other Philippine tribes.

THE BILANES (SEE PICTURE, PAGE 1166)

The Bilanes inhabit a portion of southern Mindanao lying to the west, south, and east of Lake Buluan and extending to the end of the little peninsula which

terminates in Pungian Point; also the mountain peaks of the Cordillera between Sabói and Malalag, and the Sarangani Islands, which lie immediately south of the southernmost point of Mindanao.

The mountain dwellers are attacked and enslaved by neighboring tribes, but those living in the Sarangani Islands have proved abundantly able to protect themselves.

No special study of the people of this tribe has ever been made and no reliable information is available as to their number (see page 1166).

THE BUKIDNONS (SEE PICTURES, PAGES 1164 TO 1166)

The designation "Bukidnon," which really means "mountain people," is generally understood to refer to a tribe which inhabits the subprovince of the same name in northern Mindanao, and in one or two places extends over the mountain barrier which forms the dividing line between Bukidnon and Butuan. At present they number 25,000 to 30,000. They are frequently called "Monteses," but this name is a Spanish term meaning "mountain people."

Many of the men and women are conspicuously tall. The hair of some individuals is straight and lank; others have wavy hair; while a limited number, in whose veins there doubtless flows a considerable amount of Negrito blood, have rather closely curling locks. Many individuals are of very prepossessing appearance. One's attention is immediately attracted by the small and often very slender hands and feet of the women.

Well-to-do men wear long trousers reaching to the ankles and hanging outside of these long shirts with full sleeves. Trousers and shirts are made of pieces of bright blue, scarlet, and white cotton cloth carefully stitched together in more or less elaborate geometric patterns and are of very striking appearance (see page 1166). Trousers often have cuffs at the bottoms of the legs.

Datos who have killed large numbers of enemies wear a most remarkable head ornament, fashioned from cloth of gold, with elaborate scarlet, blue, or white tassels (see page 1164). So far as my observation goes, no other Philippine tribe has anything in the least like it.

The women wear long-sleeved upper garments of scarlet, blue, and white patchwork. Their skirts are long and may be fashioned of the above-mentioned materials, or made of solid pieces of cloth purchased from the Filipinos of the north coast or the Moros who live to the south and west (see pages 1165 and 1166). Most of the women have very large silver ear ornaments of characteristic form "buttoned" into great holes in the lobes of their ears. Their hair is worn banged across the forehead, with enormous lovelocks hanging down in front of their ears. They wear rings of brass or silver on their fingers and toes, the number increasing with the wealth of the owner until individual digits are completely covered and hence become practically useless (see page 1165).

A Bukidnon man is supposed to have but one wife, but frequently keeps, more or less openly, a number of concubines.

THE MOUNTAINEERS SETTLE ON THE PLAINS

In the past the Bukidnon people have preferred to live scattered through the mountains in isolated families or small groups. During Spanish days Jesuit missionary priests brought considerable numbers of them together into villages, and since the American occupation almost all of them have been persuaded to forsake the forest-clad mountains in favor of the level, fertile plains, where they have built good houses grouped in beautifully kept and sanitary villages, which have broad plazas and clean, well-drained streets (see pages 1232 and 1236).

The Bukidnons are naturally a peaceful and a very industrious agricultural people, but in self-defense have been compelled to stand off the neighboring more warlike tribes of the interior and their Christian Filipino neighbors as well.

Since 1907, when the subprovince of Bukidnon was cut off from the province of Misamis, active efforts have been made to protect these kindly and naturally industrious, intelligent, and progressive people, and the results obtained have been most satisfactory.

BAGOBOS

On the west side of the Gulf of Davao, a deep indentation on the south coast of Mindanao, the large island at the south of the group forming the Philippines, live a primitive tribe called the Bagobos. They are remarkable for their picturesque costumes which are always gay with beads, bells and embroidery. Living in small villages, under chiefs called *datos*, they raise in their forest clearings, maize, rice and a very fine quality of hemp. The Bagobo men are remarkable for their effeminate profile and are with difficulty distinguished from the women.

BAGOBO WARRIORS

Though not essentially a warrior tribe, the Bagobos have curious religious beliefs which incite them to certain bloodthirsty and repulsive deeds. In warfare they take not only the head of their slain enemy but the hands and heart as well. Even within recent years they have been guilty of human sacrifice and their custom was to eat the sacrificial victim, all of them owned slaves obtained either by purchase or capture, and it was a slave who was usually offered at the annual festival of their god Diwata. The people generally are clean and sober, but all classes are addicted to the betel nut, which they chew with tobacco or *buyo* leaves.

CHIEF ATOS OF THE BAGOBOS

The spotted red and yellow costume shows that he has killed men. Like most Bagobos he is never without his weapons, the great *bolo* worn on his left side and the short stabbing knife at the right. Note the huge ivory ear ornament.

A BAGOBO WOMAN

The red and yellow skirt belongs only to the wife of a man killer but the rest of the costume is typical of the Bagobo women, especially the bell-decorated bag worn from the shoulder. The cheap European fan in her hand contrasts strangely with the curious bead pendant which hangs from ear to ear.

A BUKIDNON WARRIOR

He is ready for the fray. The upper part of his body is heavily padded as a protection against *bolo* cuts. The word Bukidnon means "people of the *bukid*," or mountain forest and the tribe bearing this name seems to be descended from those natives who escaped conversion and have remained in the interior from the Spanish conquest till the present day.

OLD BUKIDNON CHIEF

"*Datos* who have killed large numbers of enemies wear a most remarkable head ornament fashioned from cloth of gold, with elaborate scarlet, blue or white tassels . . no other Phillipine tribe has anything in the least like it."

BUKIDNON WOMEN, MINDANAO

" The women wear long-sleeved upper garments of scarlet, blue and white patchwork. Their skirts are long and may be fashioned of the above-mentioned materials, or made of solid pieces of cloth. They wear rings of brass or silver on their fingers and toes, the number increasing with the wealth of the owner until individual digits are completely covered and hence become practically useless."

A BUKIDNON BELLE

Though most of the Bukidnon are still pagan there are a few who are Christian. To this number the girl shown in the picture belongs. Note the cross, and the two rosaries worn around the neck. The necklace is formed of silver coins, Spanish, English and Mexican pieces being represented. The extremely modern pink celluloid comb forms a curious finish to this otherwise picturesque costume.

A BILAN MAN

The Bilans are pagans who live in south Mindanao, they are exceedingly timid folk who take to the mountains, on the approach of a stranger, in consequence little is known about them.

A BUKIDNON WOMAN

A BUKIDNON MAN

"In the past the Bukidnon people have preferred to live scattered through the mountains in isolated families or small groups. . . . Since the American occupation almost all of them have been persuaded to forsake the forest clad mountains in favor of the level, fertile plains, where they have built good houses grouped in beautifully kept and sanitary villages."

AN IFUGAO WARRIOR

The Ifugao are a branch of the Igorot nation who inhabit a small and exceedingly mountainous region in northern Luzon. They tattoo their chests, necks and arms and sometimes the thighs and their dress is both scanty and somber. Note the prehensile toes of this man.

A BONTOC IGOROT WOMAN

She is in working dress. This costume, suggestive of the style prevalent in the days of Eve, is commonly worn by Bontoc Igorot women during rainy weather or when working in the field.

A YOUNG ATÁ

The Atas are a small tribe, scattered over a tract of forest and mountain in the island of Mindanao. They are a wild people who have made but little progress, as yet, toward civilization.

AN IFUGAO HOUSE

The Ifugao houses are raised from the ground by posts having projecting shoulders designed to prevent rats and other small animals from gaining entrance. Till a few years ago the Ifugao were persistent head hunters and the skulls thus obtained form, to this day, a prominent feature of house decoration. Sometimes they are used to form a frieze and at others they are enclosed in open-work baskets dependent from the eaves. Each house has two rooms, a living room and a storeroom, the latter [illegible] cool

BENGUET IGOROT SCHOOL GIRLS

Educational work among the Igorots of Benguet has made great strides, especially as regards industrial training, and many of the girls have shown great aptitude for cloth weaving and a desire to teach the art to their neighbors.

A MANDAYA WARRIOR

There is a close affinity in manners and customs between the Mandaya and the Bagobos. Both are tribes from the Gulf of Davao in Mindanao, both offered human sacrifices, but the Mandaya as far as can be learned have never been cannibals. A death caused by accident or design is followed by a blood feud and a Mandayan will wait for years for an opportunity to spear or *bolo* his enemy. Freedom from the feud may be obtained by paying the "death price," a sum in money or stock (usually a horse), equivalent to what they consider a man's life to be worth. The Mandaya are about twice as numerous as the Bagobos, the tribe numbering some 30,000 souls.

A MANDAYA WOMAN

Note the silver "patina" on her breast, and the load of armlets. The Mandaya women blacken their front teeth by holding a quid of tobacco and strongly acid leaves between teeth and lips.

CHRISTIAN MANOBO WOMAN

The dress of some of the Manobo women is so like that of their Mandaya neighbors that at first sight it is hard to tell the difference. Both are very fond of the blue jacket and the contrast of the yellow or red skirt and both wear many heavy armlets. This is not surprising as the two tribes dwell next to each other and there is constant trading between them. This woman belongs to one of the few Christian settlements.

MANOBO MAN AND WIFE

The Manobo are a tribe of northeast Mindanao living along the banks of the river Agusan and its tributaries, the third largest river in the Philippines. They frequently act as middlemen between the tribes of the interior and the Chinese and Moro traders of the coast. Note the pad for blackening the teeth held between the woman's lips.

TWO MANOBOS AND A BUKIDNON

The latter has adopted civilized garb. Note the unusual height of the man at the right. The Manobos kept slaves, and occasionally indulged in human sacrifice, but that is now a thing of the past.

A MANOBO WARRIOR

The Manobos, like most of their neighbors in Mindanao, had a passion for killing, but they bear no resemblance to the fierce head hunting tribes of northern Luzon. Constant pressure on the part of the Moros, however, still keeps them in fair fighting trim.

LEPANTO IGOROTS AND THEIR HOUSE

Several distinct types of houses are found among the Igorots. The commonest type in Lepanto, shown here, has the curious high roof, within which is a storeroom. The floor is of dirt, enclosed by a wall of boards which does not reach up to the overhanging roof. The inhabitants have individual sleeping boards which they lay on the damp ground. Some of the Lepanto Igorots have even more primitive houses than this, being made of nothing more substantial than grass. On the whole the Igorots are an exceedingly filthy people, but of late years, they have shown a tendency to improve in this respect.

A LUBUAGAN IGOROT HOUSE

This picture shows one of the better types of Igorot dwelling, built on piles and obtaining better ventilation by being elevated above the ground. The floors laid with split bamboo are far more sanitary and comfortable than those made of earth. The pig pen—an important feature in an Igorot village—is a sunken pit on one side of the house, near which is a hole through which the animals can retreat to the walled-in space beneath the floor of the dwelling.

SON OF A FAMOUS MANOBO CHIEF

This young man is a typical Manobo dandy, observe the care with which the head-dress of red tassels is made to match a girdle of the same material, while the five great silver *patinas* on the breast marks the man of wealth and position.

A MANOBO WOMAN

The Manobos are believed to number about 60,000 people of whom some 2,000 are civilized. The latter are found in the province of Davao and most of them are Christians. They are the result of the activity of the Jesuits, who, in the last years of the Spanish rule, formed settlements for their converts and taught them how to till the soil.

A SUBANO MAN

SUBANO WOMAN AND CHILD

The Subanos, numbering about 30,000, live in the western part of Mindanao and are completely dominated by their Moro neighbors to whom they pay tribute. They are a timid industrious folk, the men are capable agriculturists and the women are skilful weavers and basket makers. At about the age of 15 both men and women commence to file and blacken their teeth which in about 10 years are ground down to the gums.

A MORO DATO

The Moros are a Mohammedan people, governed by sultans of their own, called *datos*, who seem to exercise an almost unlimited power and are notorious for their cruelty and extortion. The *datos* have given endless trouble to the American authorities.

MANGYANS

This is a wild people of the mountains of Mindoro, very much lighter in color than other Philippine tribes. This is probably due to the fact that they have lived for generations in the depths of the forests, though there is a tradition, probably of no value, that they are descendants of some white race. They are a nomadic people having no idea of agriculture or of the value of money. Exceedingly timid, they take to flight on the approach of a stranger.

ILONGOT WOMAN AND GIRLS

The Ilongots are a small tribe, probably less than 6,000 in number, living in northern Luzon. They are forest dwellers in the strictest sense of the term, living in small groups in the woods and moving their villages very frequently. They build fairly large bamboo houses of primitive design, elevated from 6 to 9 feet above the ground, before the door there is usually a wide bamboo platform like that shown in the picture.

A NEGRITO

The original inhabitants of the Philippines were the Negritos, of whom about 25,000 still remain. They are a pigmy people, the tallest man being seldom above 4 feet 10 inches high. They are a curious dark brown or black in color, have woolly hair and can use their toes almost as well as their fingers. These people are probably the lowest type of human beings known and have been described as "not far above the anthropoid apes."

A TAGAKAOLO

Living to the south of the Bagobos on the west side of the Gulf of Davao in Mindanao are the Tagakaolo, a small tribe having a height greater and a physique finer than most of the tribes of that island. Little or nothing is known about them.

A LUBUAGAN IGOROT WOMAN

Her skirt bulges out at the waist where it is supported by a "form improver" made of woven rattan. Members of this tribe are often referred to as Kalingas, but they differ from that race in certain essential particulars, although they probably have a good proportion of Kalinga blood.

A LUBUAGAN IGOROT WOMAN

She is in festal attire and has her face painted after a fashion strictly confined to the people of this region. These people dwell in a sort of "No Man's Land," where the territories of the Kalingas, Igorots, Ifuagos and Tingians meet.

A YOUNG ILONGOT WOMAN

The Ilongot women show great ingenuity in their dress considering the fact that they belong to a tribe so primitive that they are unable to count beyond ten. They embroider with surprising skill, and fashion elaborate necklaces and girdles of cowries strung on colored cloth. Bells are greatly prized by both men and women and are worn at the girdle or hanging from the necklace. Head ornaments of white horse hair are their passion and they will go to any length to obtain the coveted material, which they use very tastefully as can be seen from the picture.

A KALINGA WOMAN

This tribe—whose name literally means "Enemy"—is of mixed Malay and Negrito origin. They live in northern Luzon and number some 76,000, and were formerly inveterate head-hunters. They have high cheek bones and eyes shaped rather like those of the Chinese, but set level and usually far apart.

TIRURAY WOMEN

In the west of Mindanao is a small tribe called the Tiruray, who dwell between the Moros and the Bilans. They do not understand the arts of spinning and weaving and so depend upon their Moro neighbors for their clothes. The women wear the *sarong* or loose skirt with a very tight jacket. Around the waist are girdles of spiral brass pieces embellished with beads, and their ankles are loaded with brass rings. They blacken and file the teeth and frequently color their lips a vivid red. The tribe is poor, having no industries, and depend upon their crops of rice, corn and sweet potatoes, which they produce by the most primitive and laborious methods of husbandry.

A TINGIAN GIRL

Alone among the head hunting tribes of Luzon, the Tingian women are careful never to expose the upper part of the body, the sole exception being during the period of mourning when no upper garments are worn. They are inordinately fond of bead necklaces and of large silver ear ornaments, some of them being very beautifully made.

A TINGIAN GIRL IN MOURNING

She belongs to the more civilized branch of the tribe. Note her peculiar arm ornaments and the constriction of the forearm which they produce. This is considered very beautiful.

AN ILONGOT FAMILY

Unlike the women who are rather partial to clothes, the Ilongot man seldom wears more than a loin cloth. He is a skilful hunter depending on the chase for his supply of meat, and with bow and arrow tracks down deer and wild hogs which are abundant. Agriculture is left to the women who grow sweet potatoes, the principal article of food, a little rice, corn and bananas. The men distil a kind of rum from the sugar cane and are very fond of intoxicating liquor. Each village is generally at war with the next and fighting is conducted by ambush, never in the open. Poisoned arrows are used and they set spiked bamboos and spring guns for their enemies in places which are likely to be crossed.

WILD TINGIANS OF APAYAO

This tribe is noted for the affection existing between husband and wife and for the high moral tone of its women. Their mourning customs are peculiar. A widow discards her upper garments, fasts, and does not bathe for a period of six months, but the period may be terminated by offering the head of an enemy to the spirit of the dead man, a ceremony which is supposed to insure peaceful rest in the hereafter.

A TINGIAN MAN

Although a comparatively civilized race the Tingians have been classed as head hunters, for generations they have had to fight for their existence against the Igorots and the Kalingas and they may have acquired this habit from their enemies. They show great skill in the use of the lance a typical example being shown in the picture. Note the curious hat and the waterproof cape made of plaited straw.

A MORO BOY

The son of Dato Bata Rasa seated on the knee of Captain E. G. Miller, who lost his life while serving as Governor of Palawan. The Moros are found in their greatest strength in the Island of Mindanao and the Sulu Archipelago. They are unexcelled pirates and slave traders, treacherous and unreliable to the last degree. The whole race numbers about 300,000, has never been brought under complete control and its pacification presents one of the most difficult problems before the Philippine government.

THE TINGIAN VILLAGE OF TUI

Although they cling tenaciously to the beliefs of their forefathers, the Tingians are in many respects as highly civilized as many of their Christian neighbors. As befits one of the cleanest of peoples their well built villages are always placed on high, sanitary sites and the inhabitants are an orderly, law abiding folk. This tribe are skilful agriculturists and raise horses and cattle for the market and in consequence many of them are fairly well-to-do.

A WILD TINGIAN GIRL OF APAYAO

Note the peculiar mother-of-pearl ornaments and the blade of the miniature headaxe thrust into the hair. Among this tribe a blue thread tied around a girl's ankle is a sign that she is unmarried.

A WILD TINGIAN OF APAYAO

The Tingian man's loin cloth is almost invariably blue and in his upper garments he exhibits a decided partiality for gay colors, especially for red and yellow, two colors usually combined in his turban. As a rule he does not cut his hair and is not above supplementing the natural growth by such a feminine addition as a switch.

A TYPICAL KALINGA COUPLE

These people are the Peacocks of the Philippines. They revel in the brightest colors and bedeck themselves in large figured, gaudily colored cotton fabrics. The women have skirts reaching well below the knees and are often loaded with necklaces of agate beads which they greatly prize. On state occasions the men ornament their hair with tufts of scarlet feathers and bunches of hibiscus flowers or marigolds. Note the small waist of the man.

PADDING AS ARMOR

A Bukidnon warrior equips himself in a sort of rude armor, consisting of garments thickly padded with *kapok*, or tree cotton, held in place with yards upon yards of strong cotton cloth (see page 1164). War-knife and lance are the offensive weapons, while a large wooden shield of characteristic form is used for defense.

The Bukidnons love music and dances, in which women and girls very gracefully manipulate kerchiefs or shawls between their extended fingers, moving with a peculiar gliding step wholly different from anything to be seen among other Philippine tribes.

A distinguished visitor upon approaching a Bukidnon town is usually met by a fully armed warrior, who brandishes a formidable lance with a bell on the end of its long handle. This dangerous-looking individual dances about in a most astonishing fashion, making faces, thrusting out his tongue, and shaking his lance as if about to run one through. Though expected to smile appreciatively at this rather alarming display, a man can usually not quite forget how absolutely he is at the mercy of an armed savage.

Nearly all the Bukidnon villages have well-attended schools and are connected with telephone lines, which are freely used. The people are converting their beautiful and naturally rich country into a checkerboard, with roads and trails for dividing lines. They are giving up their picturesque native costume so rapidly that typical garments are even now hard to obtain—a fact which is to be regretted, as the garb of the Filipinos which they are adopting is not more modest or more serviceable and is far less picturesque.

THE BULANGANES

The Bulanganes inhabit a forested and mountainous region in southern Mindanao extending over some 45 miles from Tamontaca toward the southeast coast.

The Jesuits say of them that they are so savage and fierce that even the Moros are afraid of them and call them bad people.

They constitute a tribe of doubtful validity, included here solely on the authority of Jesuit missionary priests. It is highly probable that a careful study of the peoples living in the vicinity of the Gulf of Davao will result, as such a study has resulted in northern Luzon, in greatly reducing the number of recognized tribes.

THE GUIANGAS

The Guiangas, who inhabit the northern and eastern slopes of Mount Apo and the River Mala and its tributaries, in the district of Davao, are said by the Jesuits to be in all respects similar to the Bagobos, although they speak a peculiar dialect. According to the Jesuit Father Gispart, who did missionary work among them, they number approximately 6,400.

Although I have seen them only once, I venture to express doubt as to whether they are really tribally distinct from the Bagobos. I think it more probable that, as in the case of the two groups of Benguet Igorots speaking Kakanai and Nabaloi respectively, this is a case of two sections of one tribe with more or less distinct dialects.

THE IFUGAOS (SEE PICTURES, PAGES 1167, 1168, 1216, 1218, 1224, AND 1246)

The Ifugaos are a powerful, warlike, head-hunting tribe, numbering at present 125,000. They inhabit a very mountainous but for the most part unforested region in the central part of northern Luzon, which formerly constituted the northwestern portion of the province of Nueva Vizcaya, but has not been made a subprovince of the Mountain Province and bears the name of the tribe.

Although the men are not large or heavily built and many of the women are comparatively small, they are a healthy, vigorous, well-muscled, and comparatively cleanly people.

The ordinary dress of the men is a long, dark-blue clout, with or without white stripes or scarlet figures. In addition, men who can afford to do so often carry more or less elaborately woven blankets. Their chests, necks, and sometimes their legs are ornamented with tattoo patterns peculiar to the tribe (see page 1167).

Their hair is worn in a highly characteristic fashion. One is tempted to sus-

SOME OF THE MEN WHO HAVE ESTABLISHED ORDER AMONG FOUR HUNDRED THOUSAND SAVAGES IN THE MOUNTAIN PROVINCE OF LUZON

From right to left they are: Lieutenant Governor Evans, of Bontoc; Lieutenant Governor Eckman, of Benguet; Engineer Officer Kane, Lieutenant Governor Gallman, of Ifugao; Lieutenant Governor Hale, of Kalinga; Secretary Worcester; Governor Pack; Treasurer Olson; Lieutenant Governor Early, of Amburayan; Captain Hunt, Philippine constabulary; Lieutenant Governor Miller, of Lepanto, and District Health Officer Moss.

TRAVELING BY RAFT IN THE PHILIPPINE ISLANDS

"On one of my early trips four different rafts were dashed to pieces under me in two days, but I suffered no serious injury" (see text, page 1240)

pect that in cutting it a bowl is jammed down on the shock head to be barbered and the hair outside it first cut short and then shaved off. Huge ornaments of brass are often worn in the ears and spirals of highly polished brass wire adorn the legs above the calves. The *cabecillas,* or petty chiefs, and some other wealthy individuals as well, wear highly ornamented girdles made from the opercula of certain marine shells.

The costume of the women is even more simple than that of the men, consisting solely of a very abbreviated skirt somewhat precariously held in position by being wrapped around the body far below the waist, and indeed often *under* the abdomen. This skirt frequently fails to reach the knees of the wearer. A fold in it near the hip answers for a pocket. Brass ear-rings and simple strings of beads worn about the neck or in the hair complete the ordinary costume of the women, who may nevertheless wear blankets if they are fortunate enough to possess them. The women tattoo their arms, and more especially their forearms, following a fern-leaf pattern never to be seen among the people of any other Philippine tribe.

SKULLS AS DINING-ROOM ORNAMENTS

With few exceptions, the people of this tribe live in very small, compact villages strategically placed among steep-walled rice terraces so as to be easily defended. Their windowless, neatly built houses are placed well above the ground on strong posts, which are often rudely carved. Access to them is had by means of light ladders, which are drawn up at night. Each house has two rooms, one above the other, the higher of which extends into the peak of the roof and is used as a storeroom. Each house has a rude fireplace, over which may be placed the skulls of wild pigs and deer and those of carabaos eaten at feasts, as well as the skulls of enemies killed in war.

Famous head-hunters often have tastefully arranged exhibits of skulls on shelves beside the doors of their houses, hanging in baskets under the eaves, or extending around their houses in ornamental friezes at the floor level (see page 1168).

THE GREAT SALT SPRING AT SALINAS, NUEVA VIZCAYA, WHICH IS NOW BEING DEVELOPED FOR THE BENEFIT OF THE WILD MEN OF NUEVA VIZCAYA AND OF THE MOUNTAIN PROVINCE

PRIMITIVE SALT WORKS

These works are operated by Igorots at Salinas, Nueva Vizcaya, and supply salt to some 20,000 people

The Ifugaos are very skillful in the raising of rice, which they grow on wonderful terraces constructed with infinite pains on the steepest mountain sides and irrigated by water brought in ditches which are often of considerable length (see the unusual photographs of these terraces in the NATIONAL GEOGRAPHIC MAGAZINE, September, 1912). The terrace walls are usually made of dry stones, and the skill and industry which these comparatively primitive people have displayed in thus building walls 10 to 40 feet high, which stand up not only under irrigation water, but under the floods caused by terrific rain-storms, in which water sometimes falls for a day or more at the rate of an inch an hour, are greatly to their credit. Many centuries of hard, continuous work must have been required to construct these terraces. They must be seen to be appreciated, and the more one sees of them the more he appreciates the high degree of intelligence and the extraordinary industry of their builders.

Advantage has been taken of the natural ability of the Ifugaos to handle stone, and mere boys have readily been taught to split boulders, cut the stone thus obtained to the required dimensions, face it, and utilize it in the construction of dignified and imposing public buildings (see pages 1244 and 1246).

THE IFUGAOS ARE GOOD FARMERS

The Ifugaos cultivate their rice very carefully and raise splendid crops when irrigation water does not fail them. They also raise beans, onions, *gabi* (taro), and cotton on their terraces. *Camotes,* or yams, are planted extensively on the steepest mountain sides. Pigs and chickens are kept in considerable numbers, but as yet the Ifugaos have no cattle. On state occasions the wealthiest men sometimes purchase carabaos, which are turned loose to be cut down with war-knives by invited guests, each person being entitled to so much meat as he can slice off and get away with. Terrific scrimmages result, in the course of which men are often badly cut, but the injuries

BUILDING TRAILS THROUGH COUNTRY LIKE THIS, WHICH IS TYPICAL OF THE MOUNTAIN PROVINCES, PRESENTS MANY DIFFICULTIES

(SEE PAGE 1243)

received on such occasions must be taken in good part (see photographs in the NATIONAL GEOGRAPHIC MAGAZINE, September, 1912). A man who complained over having a few fingers chopped off would lose caste as completely as would a football player who objected to being tackled hard (see page 1230).

The men of certain towns, and especially of Sapao, are skillful in working and tempering steel. They make excellent lance-heads and war-knives. They are the only people in the Philippines who do not naturally and normally eat with their fingers. The poorest Ifugao usually carries a wooden spoon in his clout and uses it in feeding himself. The handles of these spoons are often well carved in imitation of human figures. Striking-looking wooden bowls carved in imitation of hogs or carabaos are in fairly common use, while under the houses of what may be termed the Ifugao nobility huge carved *tagabi,* or resting benches, fashioned from single logs and capable of accommodating two or more persons stretched at length, are often seen.

Until American control was established over them, the Ifugaos were inveterate head-hunters, and their heavy burden of field work was necessarily largely performed by women or children, while their men did sentry duty on the hilltops or stood guard over them in the fields. It is now more than six years since a head has been taken in their territory, and the several settlements are not only on friendly terms with each other, but with the people of neighboring tribes as well.

EXPERT SHOTS AND EFFICIENT POLICE

When trouble threatens, they carry plain rattan-lashed board shields, which look ugly but are effective. Their offensive weapons are formidable *bolos* and steel-headed lances. They also use bamboo lances and a few of them have rifles. Today order is maintained throughout their territory by Ifugao constabulary soldiers, who speedily become expert rifle shots and have shown themselves to be brave, efficient, and loyal (see p. 1224).

The Ifugaos have only two musical instruments: a wooden drum with skin head, used in connection with certain ceremonial feasts, and the common *gansa,* or timbrel, which they play with consummate skill. They march to its music on the trail and dance to it on every possible occasion.

Their feasts are apt to be rather uproarious. They make an excellent fermented drink from rice, and on gala occasions are prone to partake of it rather too freely.

Today they show the utmost friendliness toward Americans. They have built splendid roads and trails throughout their subprovince, over which American women may and do ride in perfect safety.

Under a continuation of the present policy the Ifugaos will go fast and far on the road which leads to better things.

Their condition and customs in Spanish days have been accurately and quite fully described by Father Juan Villaverde, a Spanish missionary priest, who labored long among them and won their respect and regard. Had the policy which he recommended been followed by the Spanish government in dealing with them, many of the results which the American government has now attained would have been achieved years ago.*

THE IGOROTS OF BENGUET, LEPANTO, AND AMBURAYAN (SEE PICTURES, PAGES 1169, 1174, 1221, 1238, 1241, AND 1255).

The Igorots who today inhabit the subprovinces of Benguet, Lepanto, and Amburayan must be considered as constituting a single tribe, although they speak several distinct dialects, of which Nabaloi and Kankanai are the more important. The territory which they occupy is for the most part very mountainous. They number today in Benguet 28,000; in Lepanto, 27,000, and in Amburayan, 34,000.

They are a robust and vigorous people. Both men and women are as a rule short, heavily built, and strongly muscled,

*I have translated and illustrated his account of this interesting tribe, and have published it in the *Philippine Journal of Science* for July, 1909.

THE SUNDAY DOG-MARKET AT BAGUIO

"Dogs are a highly appreciated article of diet, and are now brought in large numbers to Baguio from the lowlands for sale. On Sunday mornings the Baguio dog-market presents a unique spectacle" (see text, page 1201)

with broad, spreading feet. Their hair is perfectly straight. Many of them have large and beautiful eyes. As a rule the men wear their hair short, although some individuals, especially in Lepanto, allow it to grow to a considerable length.

The usual dress of the men is the clout, supplemented, when the means of the individual permit, with a cotton blanket. They are, however, glad to wear flannel shirts and coats of khaki or blue army cloth when obtainable. They also take kindly to hats. Indeed, many of them have hats of their own make.

In view of the scanty costume of the men, it is a surprising fact that the women are ordinarily careful to keep their bodies fully covered, although when working about the house, weeding rice fields, or washing clothes they frequently omit upper garments. Wealthy women often wear several superimposed skirts and nearly all bind towels about their heads (see page 1169).

WHERE SILENCE IS REALLY GOLDEN

Neither sex has any very elaborate ornaments. Some of the men adorn themselves with large bands of beads or wire and with ear ornaments of brass or silver. They often tattoo the backs of their hands. Some women have very elaborately tattooed arms, but on the whole tattooing is practiced much less extensively than among the Ifugaos, the Bontoc Igorots, or the Kalingas. The women wear similar ear ornaments and strings of beads as well. A few wealthy individuals have ear ornaments of solid gold.

In Benguet a number of wealthy women possess beaten plates of thin gold, which they wear between their lips and front teeth on special occasions, thus completely closing their mouths. Doubtless many American men would rejoice if ornaments of this character were to become fashionable in the United States. When they are worn the male sex monopolizes the conversation!

These Igorots are supposedly monogamous, although the men sometimes keep concubines, especially in Lepanto. Parents are very fond of their children and bring them up with care. The case of a boy prone to be untruthful is passed upon by a committee of old men, and if the verdict goes against him he is staked out on the ground and flogged in a fashion which he is not likely soon to forget.

DOGS AS A TABLE DELICACY

The people of this tribe are now peaceful, industrious agriculturists, and have never been head-hunters. They live chiefly on *camotes,* but raise some *gabi* and considerable quantities of rice, much of which is grown on terraces which would seem wonderful were they not dwarfed by the more marvelous ones of the Ifugaos and the Bontoc Igorots. Irish potatoes and coffee, introduced years ago by the Spaniards, are raised for sale. Pigs and chickens are kept in considerable numbers, but are as a rule eaten only on ceremonial occasions. Dogs are a highly appreciated article of diet and are now brought in large numbers to Baguio from the lowlands for sale. On Sunday mornings the Baguio dog-market presents a unique spectacle (see page 1200).

The Benguet Igorots raise good horses in considerable numbers, and both men and women ride with skill, differing absolutely in this respect from the Ifugaos, Bontoc Igorots, and Kalingas, who neither keep horses nor know how to use them.

Several different types of houses are in common use. Of these the meanest is built of grass and sits flat on the ground. Such a house usually has a raised platform of hewn boards on which its occupants sleep. A more pretentious but even less sanitary dwelling is that of certain Lepanto Igorots, which is placed on the ground, but has low board sides and a high, peaked roof which contains a storeroom. It is without windows. The occupants have individual sleeping-boards, which they lay on the damp ground (see page 1174).

In the vicinity of Kabayan the Benguet Igorots build good houses, which have floors and sides of boards and are even possessed of windows, while near Baguio and Cervantes a number of individuals have constructed up-to-date dwellings with galvanized iron roofs, furnished with chairs, tables, beds, and American

stoves. Marked improvement in house architecture is one of the results of contact with Americans.

The houses are usually grouped in small villages, but sometimes stand singly in very isolated places.

THE ONLY NATIVE PHILIPPINE MINERS

The Benguet and Lepanto Igorots have mined gold for centuries and are the only native miners in the Philippines. Ancient gold ornaments of unknown origin are still to be found among them.

At the time the Spaniards entered their territory they were armed with lances, shields, bows and arrows, and offered resistance to the invaders; but, so far as is known, they have never been head-hunters and today they are entirely peaceful.

Like the other tribes of northern Luzon, they are a music-loving people. They sing very pleasantly and sometimes use bamboo flutes to accompany vocal music. Their dance music is produced by *gansas* and long-barreled wooden drums with skin heads. The tone of such a drum is varied by fingering the head and by pressing the long barrel with the bare arm. The sounds produced by these instruments are supplemented by striking a bit of steel upon a stone. When a dance is in progress a man with the steel and stone and two *gansa* players march about with the dancers, while the drum players, usually two in number, squat close by.

A dance which is absolutely characteristic of this tribe is the so-called "bird dance," usually participated in by one man, wearing blankets over his extended arms in imitation of the wings of a bird, and one woman, who wears a blanket wrapped closely about her body. Another common dance is a circle dance, participated in by a line of men and a line of women, who devote much time to singing and bending their bodies about, but indulge in comparatively little footwork.

A number of schools have been established for these people. Girls are taught to weave good cloth (see page 1169). Young men have already been educated sufficiently to serve successfully as secretaries and treasurers of their towns.

The daily wage has risen steadily since the American occupation and opportunity to work can practically always be had by those who wish for it. The people of this tribe have prospered under American rule and today live in better houses, are better fed, wear better clothes, and enjoy better health than ever before.

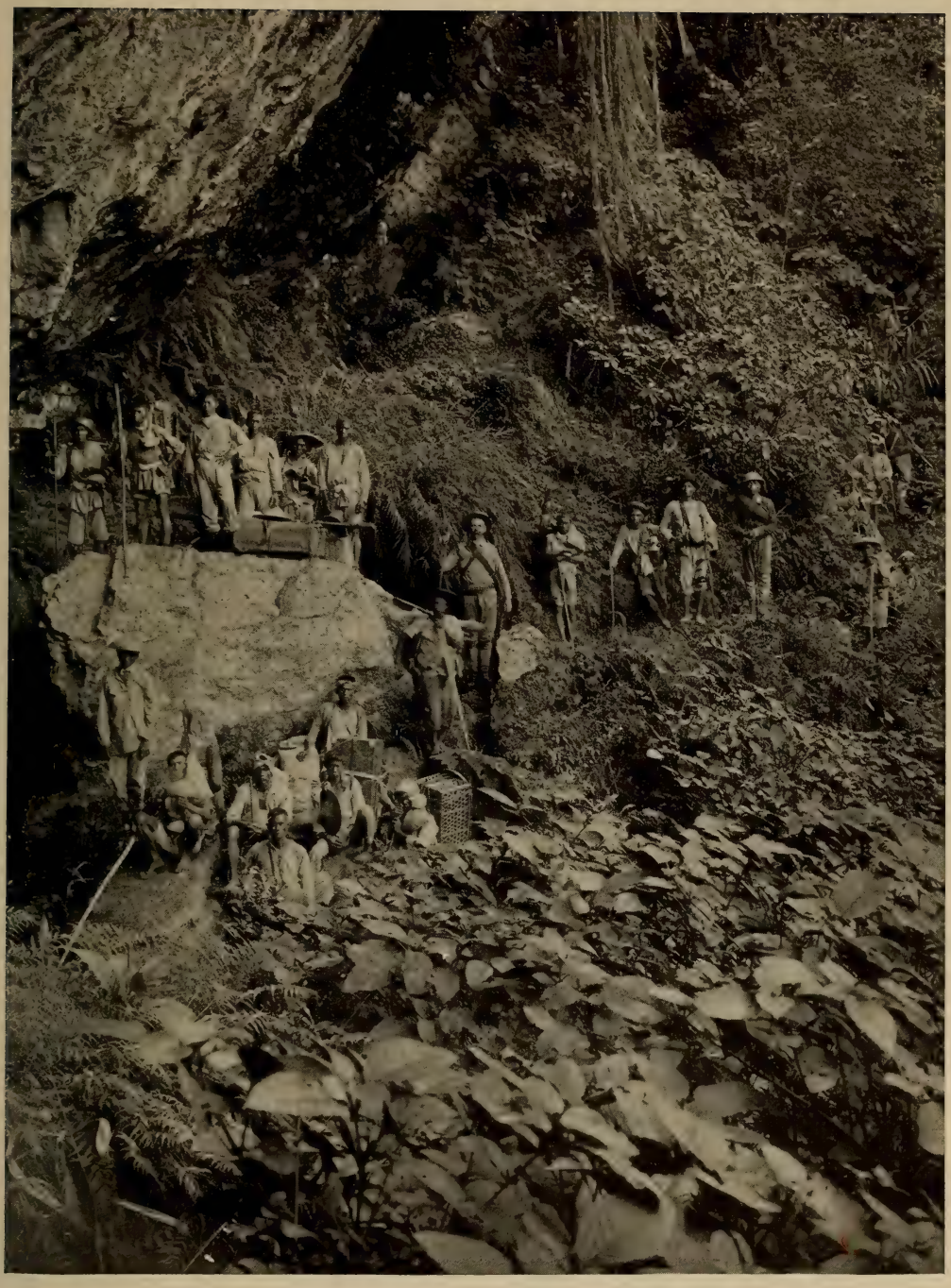
THE IGOROTS OF BONTOC (SEE PICTURES, PAGES 1167 AND 1222)

The Bontoc Igorots are a strong, warlike, head-hunting tribe numbering approximately 76,000. They are almost limited to the very mountainous region constituting the subprovince of Bontoc, but a very few are to be found in the subprovince of Kalinga. For the most part their territory is separated from that of neighboring tribes by mountain barriers.

They are straight-haired people, probably of Malayan origin. Both men and women are splendidly developed. I myself consider them physically superior to any other Philippine tribe except the Kalingas. While on the average they are more muscular than the latter people, they are at the same time more heavily, not to say clumsily, built. Both men and women are uncleanly, but there is a noticeable improvement in this regard.

The dress of the men is usually a clout, although this is sometimes replaced by a mere apron. Blankets are comparatively rare. The men have long hair banged across the forehead and rolled into a knot behind, where it is confined by a jaunty, more or less highly ornamented, rattan cap. They make huge holes in the lobes of their ears, into which they thrust wooden plugs, bamboo rings, and various other objects which they consider ornamental. Occasional individuals wear huge metal pendants in their ears.

Chains of brass wire are highly prized as waist ornaments, and the man who can attach a valve of a pearl oyster-shell to his girdle is considered fortunate indeed. The men tattoo their chests and backs very extensively. They often have numerous tattoo-marks on their arms and faces as well. These facial marks supposedly have to do with head-hunting exploits.



ON FOOT IN THE MOUNTAINS OF NORTHERN LUZON (SEE TEXT, PAGE 1240)

Before the present roads through the Mountain Province were constructed travel was extremely arduous. The so-called trails were mere foot-paths, and the fatigue involved in following them was so great that travelers endeavored to reach their destination by water whenever possible. Contrast the discomforts of travel over such a trail as this with the ease afforded by a road such as that shown on page 1212!

WHERE THE CLOTHING OF EVE IS FASHIONABLE

The typical woman's costume is a short skirt woven from thread made of bark. It is secured at the waist by a girdle of similar material, but is usually open at one side from the knee to the waist. When cloth is not available, Bontoc Igorot women often fashion really very attractive skirts from shredded banana leaves or the ornamental, magenta-colored foliage of a plant common in the Luzon Mountains. Upper garments were in the past almost never worn, but are now gradually coming into use as a result of contact with whites and Filipinos, who are teaching these light-hearted and innocent-minded daughters of nature to be ashamed of the beautiful bodies with which the Creator has endowed them. Both men and women wear blankets on occasion, if fortunate enough to possess them.

The women use ear ornaments similar to those of the men, and in addition wear in their hair and about their necks more or less elaborate strings of beads, boar tusks, dog teeth, and ornamental seeds.

When there is occasion to swim or ford streams or to work in the water in rice fields, both men and women strip without any apparent hesitation, although women who have occasion to work long in the fields usually, but by no means always, extemporize skirts of leaves (see page 1167).

The typical house of the Bontoc Igorot has a grass roof which overhangs, but does not meet, low board sides. There is a storeroom in the roof. The ground space is divided between a sleeping-box at the end opposite the entrance, a stall in which food is prepared, another stall in which it is cooked, and a larger space utilized as may be convenient.

The houses are grouped in large villages, which are often readily accessible. The people of this tribe depend on large numbers of fighting men for protection rather than on inaccessibility.

CLUB-HOUSES FOR THE UNMARRIED

The villages are divided into *atos,* or wards, in each of which there is, or should be, a group of three buildings, of which one serves as a common sleeping place for girls, unmarried women, and widows; a second answers a similar purpose for boys, unmarried men, and widowers, while the third is a sort of men's club, which contains a secret room, in which are kept the skulls of enemies killed in war, and has a second room opening off from a stone court. In this court unoccupied men loaf and talk, and here are held councils to settle important questions. The room opening from it affords a convenient refuge during inclement weather.

The Bontoc Igorots build immense systems of rice terraces with strong retaining walls. They are excelled only by the terraces of the Ifugaos. *Camotes,* however, form their principal food. They raise some beans, corn, and millet.

They not only keep hogs and chickens, but raise carabaos in some number, allowing them to run half wild and never using them for draft purposes, but eating them on ceremonial occasions.

They have manufactures of some importance, making head-axes, metal and clay pipes, earthen pots, salt, woven bark cloth, cotton blankets, well-woven clouts, and other small articles.

The Bontoc Igorots have been inveterate head-hunters, and were formerly constantly at war not only with neighboring tribes, but among themselves. Fortunately, head-hunting has now ceased almost completely throughout their territory.

They are very fond of music and dancing, in which they indulge on all possible occasions. The only instruments used are *gansas,* one of which is carried and played by each dancer throughout the performance.

The Bontoc Igorots, like the Ifugaos and the Benguet Igorots, are spirit worshippers. Their religious practices consist chiefly in efforts to propitiate the *anitos,* or spirits of the dead, who are believed to have power for good and evil.

They are monogamous, but have a curious system of trial marriage, under which young people live together for a

ONE SEES WONDERFUL VEGETATION ALONG THE TRAILS OF THE MOUNTAIN PROVINCES

"It is now possible to make in perfect comfort a most wonderful horseback trip through the Mountain Province, on which one sees magnificent tropical vegetation and the oak and pine trees of the temperate zone . . . mountain scenery of unsurpassed beauty, and a thousand and one things each of which makes its own strong appeal" (see text, page 1243).

A STRETCH OF GOVERNMENT TRAIL IN THE MOUNTAINS OF NORTHERN LUZON

time, apparently for the dual purpose of ascertaining whether married life will be congenial and whether it will be fruitful. The latter point once satisfactorily settled, they promptly marry and usually continue to live together to a ripe old age. Divorce is, however, permitted under certain circumstances.*

THE IGOROTS OF LUBUAGAN (SEE PICTURES, PAGES 1175 AND 1181)

Lubuagan is the capital of the subprovince of Kalinga. Its inhabitants and those of the neighboring villages are commonly, and perhaps properly, referred to as Kalingas, but they differ in certain essential particulars from typical representatives of this tribe. Here the regions inhabited by pure Kalingas, Bontoc Igorots, Ifugaos, and Tingians meet. It may be that the people under discussion have resulted from intermarriage between members of these several tribes. It may be that they were originally tribally distinct, but have come to resemble both the Bontoc Igorots and the Kalingas as a result of intermarriage with them. At all events, many of the men of this No Man's Land are superbly developed and many of the women are graceful and attractive.

The men wear more elaborate feather ornaments than do the Kalingas. On the backs of their heads they have the typical Bontoc Igorot rattan hats, which are, however, apt to be incrusted with agate beads. The bodies of the women, usually bare from the waist up, are often slender, graceful, and in marked contrast to those of their chunky Bontoc sisters.

About the waist and hips they wear bulky woven rattan "bustles," or "form improvers," and their skirts are stretched over these and tucked in at the waist between them and their bodies (see page 1181). The skirts are gaily embroidered and are often liberally ornamented with pendants of mother-of-pearl. Many of the women of this region paint their faces bright orange red on festal occasions—a custom unknown elsewhere in the islands (see page 1181).

Their houses resemble those of the Kalingas more than those of the Bontoc Igorots and are often grouped in compactly built towns of considerable size (see page 1175).

In warfare the Lubuagan Igorots use typical Kalinga weapons, but their music and dancing resemble those of the Bontoc Igorots in that the men carry the *gansas* and play them as they dance. The dancing of the women, however, is much more active and graceful than that of the Bontoc women.

THE ILONGOTS (SEE PICTURES, PAGES 1179, 1182, 1186, AND 1220)

The people of this tribe, also known as Ilongotes and Ibilaos, are forest dwellers and many of them are semi-nomadic. Their territory was formerly divided between the provinces of Isabela, Nueva Vizcaya, Pangasinan, Nueva Ecija, and Tayabas, but all of it has recently been added to the province of Nueva Vizcaya in order that they might be brought under centralized control. In 1820 they extended as far south as the Laguna de Bay, and some of these people could then occasionally be met with almost in the outskirts of the city of Manila; but their hand has been against every man and every man's hand has been against them, with the result that their number has decreased and their territory has diminished as they have been driven back before advancing civilization. It is thought that they do not now number more than 6,000.

They are a sharply marked tribe. Many of the men and women are of such low stature as to appear dwarfish. In the territory which formerly belonged to Isabela the Ilongots have intermarried freely with the Negritos and their physical characteristics have in consequence been profoundly modified. But even in the territory where this has not occurred many of the men are heavily bearded.

A clout, scarlet when possible and often ornamented with beads, constitutes

* A very full description of these people by Dr. Albert E. Jenks has been published by the Bureau of Science at Manila in the form of a beautifully illustrated book entitled "The Bontoc Igorot."

A DELEGATION COME TO MEET THE AMERICAN COMMISSIONERS

When seen close at hand this trail looks level, but when viewed at a distance the grade is readily perceptible

the usual man's costume. The women wear short skirts reaching from the knee to the waist and, when obtainable, upper garments as well (see page 1186). Often both men and women are clad in bark cloth only, on account of the impossibility of obtaining anything better.

A PASSION FOR ORNAMENT

They take delight in ornamenting their garments with beads, bits of shell, and other bright objects, and display extraordinary patience and skill in doing this work and in fabricating elaborate chains from bits of wire and tasseled ornaments from white horse-hair (see page 1182). Garments and tobacco pouches are often embroidered with some little skill. Many of the men wear brass-mounted ear ornaments fashioned from strips of the scarlet beaks of hornbills. Their hair, which is apparently never cut, is usually confined above the forehead with a net and, wrapped with rags or bark, forms a projecting chignon at the back of the head. Back baskets and knife sheaths are elaborately ornamented with beads, tassels, and horse-hair plumes. Both sexes wear belts or girdles of cowries.

Their houses are somewhat primitive and one is sometimes occupied by several families. Access to them is obtained by climbing notched poles. Pieces of wood fashioned like long horns usually extend from the two ends of the short ridgepole. A number of houses may be found near each other, but, so far as my observation goes, never closely grouped.

The Ilongots cultivate forest clearings in a haphazard sort of way, growing upland rice, *camotes,* and a little sugar-cane, but they subsist largely on game and fish. They are skillful in the use of the bow and arrow, which they have probably learned from their neighbors, the Negritos. Their lances have small, weak heads and the shafts are usually ornamented with spiral bands, differing in this respect from the lances of all other Philippine tribes. War-knives, or *bolos,* are well made and formidable. They are carried in rather elaborately carved sheaths, the form of the sheath not corresponding at all to that of the knife. Their light, narrow wooden shields are primarily intended for stopping arrows.

HEAD-HUNTERS IN AN AIMLESS SORT OF WAY

The Ilongots are head-hunters in an aimless sort of a way. They invariably attack from ambushes, which are often most skillfully prepared. Until quite recently, they have annually killed a considerable number of Filipinos, and although they have now given up this highly objectionable custom, in the more remote settlements they still fight among themselves.

They are a timid, very suspicious, and highly emotional people. When friends who have been separated for some time meet they often weep copious tears for no apparent reason except that they are glad to see each other.

The Ilongots are a filthy people, and as a result suffer dreadfully from skin diseases.

Their dancing, which, so far as my observation goes, is indulged in by men alone, is a most extraordinary performance which must be seen to be appreciated.

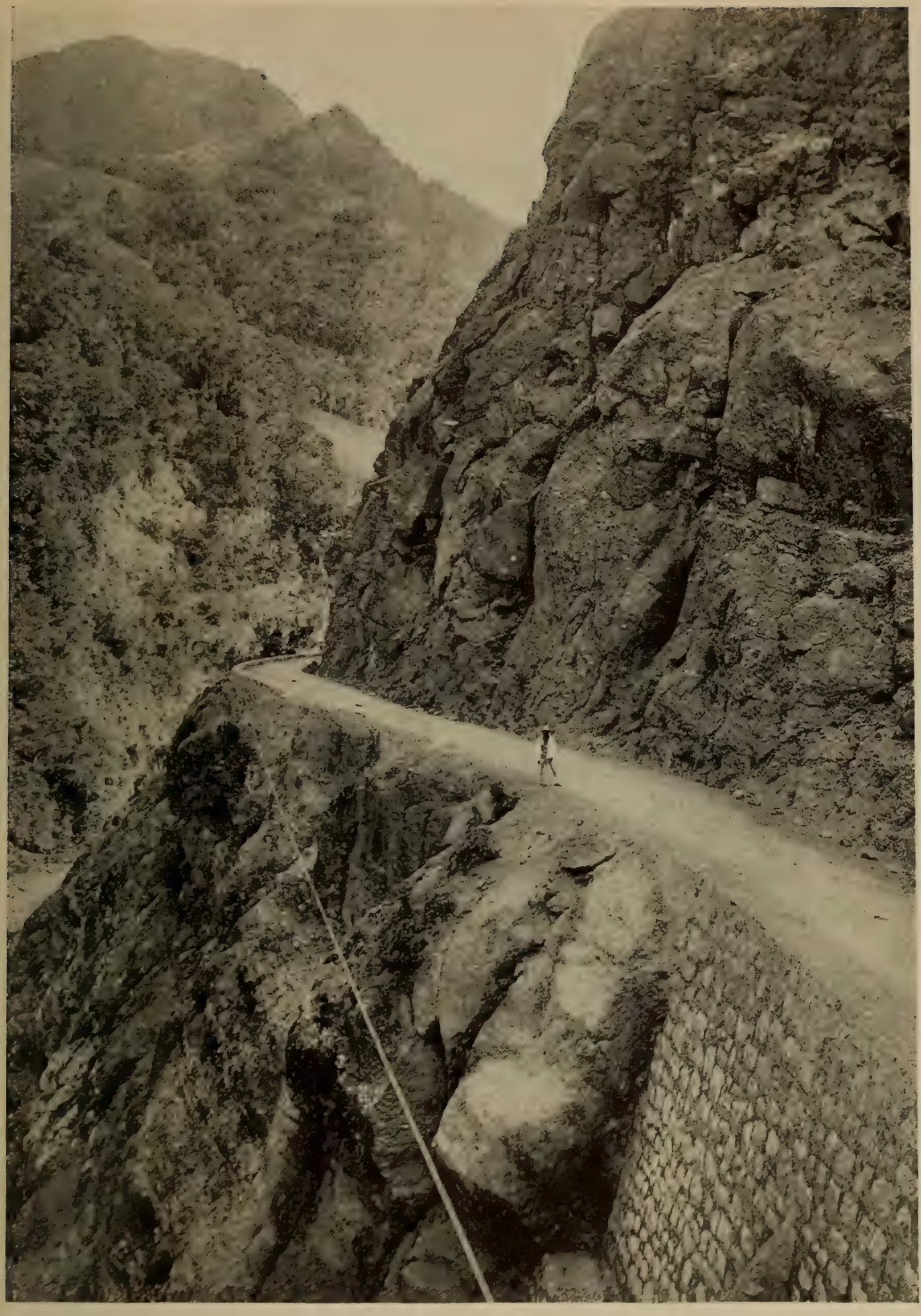
Two schools have been established for them and, contrary to my expectation, their children have proved bright and teachable, readily learning to speak English quite fluently and promptly profiting by opportunity to do industrial work. The extraordinary patience and manual dexterity which these barbarians display in fashioning their ornaments should some day become a valuable commercial asset for them.

Friendly relations have now been established with the people of practically all their settlements, but it will require a much longer time to civilize them than will be needed with most of the wild tribes, and there is no present reason to believe that individuals having much Negrito blood will ever be civilized.

In many particulars there are extraordinary similarities between the Ilongots of northern Luzon and the Mandayas of Mindanao. The relationship between these two peoples, now so widely separated, ought to be carefully worked out.

AN OLD TRAIL WITH ITS FOOT-BRIDGE

"The so-called trails were in most cases mere foot-tracks made by the wild men, over which the tough and sure-footed Philippine ponies could not even be led" (see text, page 1240)



ON THE NEW BENGUET ROAD

This picture shows a remarkable contrast between old and new when compared with one of the old trails shown on page 1210. For 21 miles this road runs through scenery which for beauty cannot be excelled anywhere in the world.

A MOUNTAIN PROVINCE TRAIL

"On account of limited funds the trails are built narrow at the outset, but are rapidly widened, in connection with maintenance work, until they become passable first for narrow tread carts and then for carts of ordinary size" (see text, page 1243).

THE KALINGAS (SEE PICTURES, PAGES 1183, 1192, 1225, AND 1226)

The Kalingas are a strong, head-hunting tribe, numbering some 76,000, inhabiting a subprovince bearing their tribal name situated in the central part of northern Luzon. Their territory is, on the average, somewhat less mountainous than that of the Ifugaos and Bontoc Igorots.

Both men and women are comparatively tall and in many instances are extremely well formed (see page 1183); the perfect muscular development and graceful figures of the men are especially noteworthy. In my opinion, the typical Kalinga warrior is the finest-looking wild man to be found in the Philippine Islands (see page 1192). As a rule the members of this tribe have straight hair, but an occasional rare individual, bearing no other resemblance to the Negritos, displays a shock of fuzzy wool which is hard to account for.

THE PEACOCKS OF THE PHILIPPINES

The Kalingas are the most gaily dressed people of northern Luzon. The men wear regulation clouts, but they are not seldom ornamented with beads, buttons, etc. Their short jackets of gaudily colored cloth are also often adorned with beads and tassels. Gay turbans are commonly worn, and the hair, banged across the forehead and left long behind, is frequently stuck full of scarlet Hibiscus, marigolds, or other gay flowers and of really gorgeous feather ornaments.

Handsome blankets worn over one shoulder and under the opposite arm and ornamental bags for carrying small personal belongings complete the usual costume of the male, except for the ear plugs, which are fashioned with especial care and are often inserted in such a way as to project backward against the sides of the neck and turn the lobes of the ears directly forward. Their front ends are covered with embroidered cloth or adorned with highly polished coins, bits of looking-glass, or other bright objects. In some instances the ear plugs are made of rolls of bright-colored worsted (see page 1192).

FALSE HAIR HEREDITARY IN THIS TRIBE

The women wear gaily colored upper garments and skirts. The wealthier ones have enormous necklaces of agate beads, while heavy and peculiarly shaped ear ornaments of brass and of mother-of-pearl are almost invariably in evidence. Their heads are adorned not only with abundant natural locks, but with switches made from the tresses of departed female ancestors, and into the masses of hair thus built up are thrust gay scarlet and yellow feather plumes.

The Kalingas are a cleanly people and their beautifully formed bodies are usually free from disfiguring skin diseases. They live in small villages.

The wealthier Kalinga men are usually openly or secretly polygamous, but their first or lawful wives are apt to lead subsequently acquired favorites a dance.

Many of the Kalinga houses are extraordinarily well built on conventional lines which show little variation. There is a place for everything and everything is kept in its place. Furthermore, the houses are clean. A feature especially appreciated by those who have to sleep on their floors is that the flooring, which is made of rattan or of stems of *runo* grass, can be, and is, rolled up daily in the early morning, taken down to the nearest stream and thoroughly washed.

When inter-tribal warfare was general among the Kalingas, tree houses were common, but they have become comparatively unpopular, now that it is safe to build on the ground.

The Kalingas raise rice, *camotes*, and sugar-cane in considerable quantities, using the latter for the manufacture of a fermented drink called *basi*. Many of them are skillful hunters, adding to the family food supply by killing wild carabaos, deer, and hogs.

THEIR PREFERENCE IN WEAPONS

In war the men protect themselves with very artistically shaped wooden shields. Their offensive weapons are slender but deadly light head-axes and savage lances. Like most other northern Luzon tribes, save the Ilongots and Negritos, they do not use bows and arrows (see page 1225).

A FLYING FERRY IN OPERATION

When streams in the Mountain Province are so wide and swift that fording is impossible, flying ferries are installed, pending the construction of bridges. The stream here shown can be forded at low water, but is impassable during storms

A MOUNTAIN PROVINCE BRIDGE BUILT UNDER AMERICAN RULE

Bridges have to be placed at a great height above ordinary water level, as the streams of the Mountain Province are subject to terrific floods. During 1911 there was a rainfall of 38.8 inches in 24 hours. Later there was a rainfall of 31.4 inches in a like period. During the latter storm the wind reached a velocity of 108 miles per hour.

Their music is supplied by *gansas*, which are played in a fashion peculiarly their own. Their dances, in which one man and one woman usually participate, are energetic but ungraceful, and are usually individual performances of very brief duration.

Their religion, like that of their neighbors to the south, is a form of spirit worship.

No schools have as yet been established for their children, but there is reason to believe that the latter will prove apt pupils.

The Kalingas have until very recently been inveterate head-hunters. Crimes of violence are now comparatively rare among them and are for the most part confined to remote and inaccessible portions of their territory. While they bitterly hate their Filipino neighbors in Cagayan and are at times with difficulty restrained from continuing to take vengeance for past injuries, they are more than kindly disposed toward Americans, who can now travel safely through any part of their territory—a condition particularly appreciated by me; for I certainly diced with death when I first crossed it, with one American and one Filipino companion, in 1906.

THE KATABAGANES

The Katabaganes are a wild tribe of Malay origin inhabiting the mountains in Tayabas near the Ambos Camarines boundary.

But a few individual representatives of this tribe now remain, and practically nothing is known concerning them except the mere fact that they exist in the region mentioned. No photographs of them have ever been obtained.

THE MANDAYAS (SEE PICTURES, PAGES 1170 AND 1171)

The Mandayas, said to number some 30,000, inhabit the upper waters of the

A CONFERENCE WITH IFUGAO HEAD MEN

At this conference the Ifugaos voluntarily imposed upon themselves a public improvement tax of one dollar per man per year. Men not able to pay the tax work ten days each. From left to right the Americans are: William F. Pack, governor of the Mountain Province; Dean C. Worcester, Secretary of the Interior, and Jeff D. Gallman, lieutenant governor of the subprovince of Ifugao.

Agusan River in Mindanao; also the valley of the river Salug and the territory between the headwaters of the Agusan and the town of Mati, on the Mindanao east coast.

Among them are to be seen many fine-looking individuals, with almond-shaped eyes and long, straight lashes, which give them a peculiar appearance. Their skins are light in color and are described by the Jesuits as "ashy gray." Both men and women commonly go fully clothed, the men wearing embroidered cloth trousers, with tasseled fringes at the bottoms of the legs, and handsomely embroidered shirts, while the women are clothed in elaborately embroidered long-sleeved upper garments and peculiar skirts woven of hemp in color patterns which are said to be produced by the manner of dyeing the individual fibers rather than the method of weaving them. A weaver who knows how to produce more than one of the several patterns is a great artist.

The women often have their arms loaded down with ornaments of brass and shell. Their hair is banged squarely across the forehead and worn in a knot on the back of the head, and into this is usually thrust a silver-mounted wooden comb. Bead necklaces are commonly worn. At the waist there hangs a huge mass of ornaments and charms (see page 1171).

Both men and women have long hair, and frequently wear long "beau-catchers" hanging down in front of their ears. Their hats, with feather ornaments very similar to those worn by the Ilongots, are ingeniously fashioned from bark and have two lateral strings so placed that when they are pulled apart the bark is bent. They are then placed against the sides of the head, and as the bark springs back into position the strings are tightened and the hat is thus firmly fastened on (see page 1170).

The Mandayas use bows and arrows with much skill. Their long, slender shields, which are sometimes ornamented with beads, remind one of the shields of the Ilongots, as do their strong, curved fighting knives, the sheaths of which are in size and form out of all proportion to the blades they contain.

SKILLFUL METAL-WORKERS AND JEWELERS

Some of the men are very skillful in working metals. They ornament the sheaths of knives with tastefully decorated silver bands and even inlay steel blades with silver. They hammer out great circular plates of silver called *patinas* and ornament them with engraved marks arranged in geometric patterns. They also work and temper steel with much skill.

Some of the Mandaya houses are fairly well built wooden structures, roofed with shingles made out of flattened bamboo. Others are much more primitive and are built in trees.

The Mandayas have in the past been inveterate fighters and slave takers. As yet they have been only partially brought under government control, and neither inter-tribal warfare nor slave-taking have been entirely checked. I once met a man who was carrying, but not wearing, the scarlet coat of a *Bagani,* or man who has killed six persons. I asked him if he was a Christian and he said he was. I asked him if he was a *Bagani* and he said *not yet;* he had killed only five people!

The Jesuit Father Pastelo has estimated the number of this tribe at approximately 30,000. The Manobos and the Moros are the only two Mindanao tribes which outnumber them.

THE MANGUAGUANS

The so-called Manguaguans inhabit the territory between that occupied by the Manobos and that occupied by the Mandayas. Although they are recognized by the Jesuits and others as a distinct tribe, I myself, after observing them for some time, am of the opinion that they are not entitled to such recognition. I consider them to be just the sort of people of mixed descent that one might expect to find in a region between the habitats of two tribes like the Manobos and Mandayas. These two tribes really imperceptibly grade into each other through the so-called Manguaguans.

THE MANGYANS (SEE PICTURE, P. 1178)

The Mangyans inhabit the interior of the great island of Mindoro. They are

DISTRIBUTING PRESENTS

Secretary Worcester is giving "congcong," or strips of white paper, to Ifugaos at Mayoyao. Ifugaos are very fond of these paper strips, which they put in their hair (see text, page 1243)

variously estimated to number from 5,000 to 20,000. This tribal designation has also been applied with doubtful propriety to the wild inhabitants of the little island of Sibuyan, who have now almost entirely disappeared. It may be that when we know more of the Mindoro Mangyans we shall find it necessary to divide them into several different tribes. I myself have lived among those inhabiting northern and central Mindoro, and have repeatedly visited those living in the southern and western portions of the island.

The northern Mangyans, especially those living on the slopes of Mount Halcon, are a very primitive people. The costume of the men consists of a clout only. The women also wear clouts, supported by braided rattan cord coiled around waist and hips. Little girls begin with only enough cord to go around the body two or three times, while old women often wear great masses of it. Girls of marriageable age and young unmarried women usually cover the breasts with a band made from the dried petiole of a banana leaf stitched with rattan. Clouts are usually made of bark cloth (see page 1178).

In the northern part of the island men and women have few, if any, ornaments and usually lack blankets. They are seminomadic, and when wandering through the forests in search of *cabo negro* palm trees, from which they obtain a starchy product similar to sago, they build individual shelters of the flimsiest character. I have seen them asleep in the rain, crouching on their haunches over small fires and each sheltered only by two or three rattan leaves, shaped much like huge ferns, stuck into the ground in such a way as to bend over.

Some of the members of the tribe spend the dry season wandering about in search of fish and game, which they take very skillfully with bow and arrows, and helping out their bill of fare with such vegetable products as they can obtain from the forest. When the rainy season begins they build more substantial structures, consisting of good-sized platforms of poles roofed over with palm or rattan leaves.

Some Mangyans make forest clearings and cultivate the soil to a limited extent, raising *camotes* and a little rice and sugar-cane.

HOW A PROFESSOR OF MATHEMATICS COUNTS

The Mangyans are sometimes polygamous. They are of low intelligence and are ordinarily unable to count above three. Professors of mathematics can, however, count up to twenty by utilizing fingers and toes. The common method of procedure in dealing with numerals above three is to tie the requisite number of knots in a bit of rattan. I have traveled for days with no other helpers or companions than Mangyans, with whom I was compelled to communicate by signs, yet we got on beautifully. They are kindly, gentle people who will never make trouble if decently treated, but when abused they are capable of revenging themselves, using for the purpose exceedingly deadly poisoned arrows.

They are by no means fastidious as to their animal food. I have seen them gorge themselves with the rotten flesh of the *tamarao,* or small Mindoro buffalo, although it smelled to heaven and crawled with maggots. If a white man had swallowed a bite of it he would probably have died of ptomaine poisoning, but they ate it with satisfaction and with apparent impunity. Snakes, crocodiles, and huge white grubs all form table delicacies highly appreciated by them.

The Mangyans in southern Mindoro are a much less naked people than are their northern brothers. The men frequently possess good shirts and wear neat cloth clouts ornamented with beads. They also wear bead necklaces and braided rattan armlets. Into the latter are thrust feather or flower ornaments. They are long-haired and frequently use head bands or small turbans. The women also wear beads in abundance, don cloth skirts over their clouts, and frequently have upper garments as well. These people raise, spin, and weave cotton.

AN ANCIENT PHILIPPINE ALPHABET

The Mangyans of southern Mindoro differ from all other Philippine tribes save the Tagbanuas, in that they have re-

tained and still use their ancient syllabic alphabet, scratching the characters on freshly cut joints of bamboo or bits of banana leaf.

They build comparatively good houses, and are more active and systematic in cultivating the soil than are their northern brothers. Several schools have been started for their children, who prove to be bright pupils.

In northern and northwestern Mindoro many individual Mangyans show marked evidences of Negrito blood. I believe that there have been Negritos in this island and that they have disappeared by fusing with their neighbors.

The interior of southern Mindoro has been found to be, relatively speaking, quite thickly populated. The inhabitants raise cotton and spin and weave their own cloth. They are so timid that it has thus far been impossible to establish communication with them.

Like the people of all other Philippine wild tribes, the Mangyans have their own peculiar music, using bamboo flutes and primitive stringed instruments to produce it. They sing a good deal. Certain individuals among them pretend to a sort of clairvoyancy and profess to be able to tell what persons at a great distance are doing.

The Mangyans communicate with each other in the forest by beating on the enormous buttressed roots of certain trees, apparently using a primitive sort of Morse alphabet.

All in all, they are a very interesting people, deserving of a more careful study than they have as yet received.*

THE MANOBOS (SEE PICTURES, PAGES 1172, 1173, 1176, 1234, AND 1235)

The Manobos are said to be the second most powerful tribe in Mindanao, although the Mandayas compete with them closely for this position. They are believed to number about 60,000. They inhabit the whole lower Agusan River valley and are found in smaller numbers to the north of Malalag on the Gulf of Davao, on Cape St. Augustine, and at various points in the interior of the district of Cotabato, even extending across the line into the subprovince of Bukidnon. They are a more than ordinarily tall and rather light-skinned people, with hair which is often wavy and sometimes curls quite closely; but as their territory abuts upon that of the Negritos in northern Mindanao, it is probable that intermarriage with the latter tribe accounts for the occasional occurrence of closely curling hair.

Their dress is very similar to that of the Mandayas (see page 1172). Indeed, most of the women wear Mandaya skirts, many of which are said to be made by Manobo women captured in war by the Mandayas, kept as slaves, and taught the complicated art of skirt-making. Rich people also wear the great engraved silver disks called *patinas,* which are manufactured by the Mandayas and are so highly prized by their women (see page 1176).

The Manobos, however, differ from the Mandayas in language and in customs to a marked degree. Furthermore, they seem to lack the skill in weaving and in metal working which the Mandayas possess.

Heretofore they have lived in single houses or small groups of houses scattered through the forest, but under American rule have been persuaded, in the Agusan River valley, to gather into villages along that stream and its tributaries.

Until compelled to give them up, they kept slaves and occasionally indulged in human sacrifices; in fact, it was by no means unheard of for a wealthy Manobo to tie up a slave, give his small boy a lance, and have the boy experimentally test different ways of killing and maiming by thrusting the lance into the quivering flesh of the unhappy victim.

The Manobos practice agriculture in a more or less haphazard way, raising corn, rice, and yams, but often losing their crops as a result of floods. Their houses were wretched structures, but under American tutelage they have readily learned to construct much better ones (see pages 1234 and 1235). Many of them, however, still live in the tree-tops.

* Mr. Merton L. Miller spent some time among them and has published the results of his observations in the *Philippine Journal of Science* for June, 1912.

HONOR MEN OF THE BENGUET IGOROT POLICE (SEE PAGE 1245)

These men are wearing medals of honor given them for saving the life of Governor William F. Pack, who was swept away by a mountain stream in flood and would have drowned had they not plunged in after him.

BONTOC IGOROT CONSTABULARY SOLDIERS (SEE PAGE 1245)

A few years ago these men were head-hunting savages; today they form as smart and up-to-date a body of troops as can be found anywhere. They are extraordinarily well disciplined and efficient and are not hampered with trousers

In general, it may be said that those inhabiting the lower Agusan Valley, where they had long been mercilessly exploited by their Filipino neighbors, are debauched with bad liquor, broken-spirited, and hard to deal with, while the fighting Manobos further up the river, who in the past managed to maintain their independence, are now progressing much more rapidly.

WAR AND SUPERSTITION

Among the wilder Manobos the passion for *mangayaos,* or killing expeditions, is strong. The fighting men are, however, very superstitious, and if they hear a small pigeon, called *limocon,* call in the wrong direction, will immediately return home.

The Manobos who inhabit the back part of the subprovince of Bukidnon are physically an especially fine lot (see page 1173). The men in this region fight fiercely when unjustly treated, but have shown themselves very appreciative of fair and kindly usage, and, as a result of having received it at the hands of Americans, are rapidly forming villages and settling down.

The Manobos believe in an endless series of spirits or supernatural beings, called *busaos,* each of which is endowed with especial powers. Their priests, or *bailanes,* go through elaborate and remarkable ceremonies in establishing communication with the spirits and in communicating the desires of the latter to the people. At times these singular individuals seem veritably to become possessed of devils, and are dangerous if they can gain access to deadly weapons. I once had the good fortune to be present when the *busaos* were being called and witnessed some extraordinary sights.

The people of this tribe are especially fond of music and dancing, and their pantomimic dances far exceed, in number and variety, those of any other Philippine tribe with which I am familiar. In the course of an evening I have seen them mimic the woodpecker, the monkey, the robbing of a bees' nest, an old man with elephantiasis trying to dance, a young man stealing a kiss from a sleeping maiden, individual peculiarities of persons present, and what not.

THE MONTESES

The wild people, other than Negritos, who inhabit the mountainous interior regions in Panay and Negros, are commonly called *Monteses.* As the designation is a Spanish word meaning "mountain people," it is obviously unsatisfactory.

They are also called *Bukidnon,* and it may be that they are descended from the same parent stock as are the people of northern Mindanao, to whom this latter name is invariably applied, but if this is the case I have failed to note any evidence of it. It should be stated that "Monteses" is also an alternate name for the true Bukidnons.

They are a people of Malay origin, whose original manners and customs have been much modified by contact with Filipinos and Negritos. The men wear clouts, the women skirts and camisas. They build fairly well-constructed houses of good size, but live a family or two in a place as a result of their belief that a person who dies needs some one to accompany him on his long journey, so that it is incumbent on his male relatives *to start a companion on the same road he is traveling.* As almost any one will do, a somewhat disturbed state of society results.

These people practice agriculture to a considerable extent.

They quarrel and fight among themselves, using exceptionally long *bolos* with peculiarly carved hilts and good, strong lances.

I lived among them in Negros for six weeks, but unfortunately the photographs then secured have since been destroyed.

At first they sought an opportunity to kill my companion and myself, believing that we had come to poison the stream from which they obtained their drinking water. Later, noting that we paid more for tiny birds' eggs than hens' eggs were worth, bought snail shells, and did other, to them, inexplicable things, they decided

IFUGAO CONSTABULARY SOLDIERS (SEE PAGE 1245)

These men use the rifle with deadly accuracy and have shown themselves to be brave, efficient, and loyal. As a result of their activity the Ifugao territory is entirely quiet, and it is now more than six years since a head has been taken in the country of this once unruly head-hunting tribe

A KALINGA WARRIOR WITH HIS TRIPLE-BARBED LANCE AND CURIOUSLY SHAPED WOODEN SHIELD

"In my opinion, the typical Kalinga warrior is the finest-looking wild man found in the Philippine Islands. . . . In war the men protect themselves with very artistically shaped wooden shields. Their offensive weapons are slender but deadly light head-axes and savage lances. Like most other northern Luzon tribes, save the Ilongots and Negritos, they do not use bows and arrows" (see text, page 1213).

KALINGA POLICE

The wild men who join the police in the Philippines do not immediately develop into the smart, soldierly troops shown on pages 1222 and 1224. The Lubuagan police of Kalinga, for instance, wear their ordinary but scanty costume, merely attaching a police badge to their gee-strings.

that we were crazy, and after that we got on famously with them.

THE MOROS (SEE PICTURES, PAGES 1177 AND 1189)

"Moro" is the Spanish word for Mohammedan, or Moor, and in the Philippines is used as a generic term applicable to all of the Mohammedan peoples who inhabit the coast region of the southern third of the island of Palawan, and also Balabac, Cagayan de Jolo, Tawi Tawi, Siassi, Lapac, Jolo, Basilan, and very numerous adjacent small islands, as well as much of the coast region in western and southern Mindanao and the lower part of the Cotabato River valley and the Lake Lanao region.

Moros of different regions differ considerably in language, dress, and customs, but have many things in common, the most important of which is the Mohammedan religion, which has fundamentally modified their natures and made them in many particulars essentially different from the other Malayan peoples of the Philippines.

Many of the men wear their hair short, but the Yacans in the interior of Basilan and the Moros of Lake Lanao wear it long. Turbans are in common use, although the Turkish fez makes an acceptable substitute, and *hadjis,* or men who have visited Mecca, wear tightly fitting white caps. As a rule, men dress in very tightly fitting jackets of cotton or silk, which are sometimes black or white, but are more frequently gaily colored. Their "dress-up" trousers are skin-tight below the knee, while those worn when they are at work or are expecting to fight are often as loose as pajama trousers (see pages 1177 and 1189).

Women wear similar loose trousers, with or without skirts, and cover the upper part of the body with tightly fitting jackets, often left open down the front to a point between or below the breasts. Like the men, they are passionately fond of the brightest colors.

PIRATES AND PEARL DIVERS

Except in the interior of Basilan and in the Lake Lanao region, the Moros are essentially a water people. Some of them live in their boats for long periods, while most build their houses on piles in the water whenever practicable, so that they can drop into their boats and be off on short notice. They are wonderful swimmers and divers. It is said that many of the best divers employed in the Ceylon pearl fisheries come from Jolo.

The Mohammedanism of the Moros is of a somewhat washed-out character, and many of the laws of their religion are more honored in the breach than in the observance, but such as it is they believe in propagating it with the sword, and fight with fanatical bravery.

Many of the men are skillful in working metals and fashion steel krisses, barongs, and campilans of deadly excellence. They also use lances, and in protecting themselves employ heavy, round wooden shields. From time to time certain individuals take solemn oaths to die killing Christians, and are then known as *juramentados,* or "sworn men." They secrete deadly weapons, betake themselves to places where there are crowds of people, and then run wild, cutting down every one within reach until they are themselves killed. They believe that as a reward for this commendable procedure they go straight to the seventh heaven.

Volumes might be written about the Moros; but I must content myself with saying that Dr. N. M. Saleeby is the greatest authority on them, and that some of the results of his important investigations have been published by the Philippine Bureau of Science.

The problem involved in tranquilizing and civilizing these people is a very grave one. It is my opinion not only that its solution is not yet in sight, but that we are at present not making as much progress as we might. At all events, we have performed a valuable service in releasing slaves who were formerly held in large numbers, and in effectively preventing the piratical and slave-hunting raids in which Moros promptly indulge when left to their own devices.

THE NEGRITOS (SEE PICTURE, PAGE 1180)

The Negritos, generally considered to be the aborigines of the Philippines, are

racially distinct from all the other peoples inhabiting the Archipelago which have not intermarried with them. It is probable that they originally occupied every island of any size in the group; but at present they occur only in northeast Mindanao, Samar, central Negros, central Panay, a few small islands north of Panay, north central Palawan, a few isolated points in southern Luzon, the mountains of Bataan, and Zambales, where they are relatively numerous; Abra, where there remain but a few individuals of mixed descent; Apayao, Cagayan, Isabela, and Tayabas.

The great forested and almost unexplored area extending from the northernmost point of Luzon to the vicinity of Casiguran and Baler is today the one remaining Negrito stronghold, and in many parts of this region it is still quite impossible to get into touch with them, for they flee at the approach of strangers.

They are of low stature; their skins are dark brown to black; their hair is woolly and closely curling; their bodies, arms, and legs are more or less thickly covered with "pepper-corn" hairs (see page 1180). Many of the men are abundantly bearded. It is a common custom with both men and women to shave the crown of the head, as they say "to let the heat out."

The Negritos are known in different parts of the Archipelago under different names, such as Abunlon, Aetas, Balugas, Buquiles, Dumagats, and Bataks, and after further study it may prove necessary to separate them into a number of tribes. This is, in my opinion, especially likely to result in the case of the woolly headed blacks of Palawan; but our present knowledge reveals such resemblances between the several groups of Negritos, and there are such radical differences between them and the Malay tribes that one is prone to regard them as *a people*. Not only are they characterized by low stature, dark skins, woolly hair, and flattened noses, but they all have the custom of sharpening their front teeth, and ornament their bodies with scar patterns instead of with the tattoo-marks so universally employed by the people of other tribes. There is a striking similarity between some of the Negrito scar patterns and those of the central African dwarfs.

INCAPABLE OF CIVILIZATION

The Negritos are bow and arrow people in the strictest sense of the word. They make and use an arrow poison of deadly effectiveness and are sufficiently skilled occasionally to bring down birds on the wing. Many groups of Negritos live exclusively by hunting and fishing and build the flimsiest of temporary shelters in lieu of houses. Others occasionally practice agriculture in a very primitive way and build rather more substantial "houses," but as often as not forsake their planted clearings before harvest time.

Negritos most certainly lead the simple life and their wants are few indeed. Their only domesticated animals are dogs and an occasional tame jungle fowl.

Unless able to purchase cotton cloth from Filipinos, they clothe themselves in the bark of trees. They make practically nothing but bows, arrows, fish-lines, fish-hooks, and a few baskets.

As to their numbers, one man's guess is about as good as another's. There may be 25,000 of them left.

Mentally, they are about on a par with the blacks of Australia or the bushmen of South Africa. Their birth rate is believed to be far below their death rate. Within a comparatively short time they have disappeared from Cebu, Masbate, Sibuyan, and probably also from Mindoro, where none can now be found. Only a few individuals remain in Tablas, Tayabas and Samar.

As I have elsewhere stated, it is not too much to say that *they are a link which is not missing, but soon will be!* In my opinion they are absolutely incapable of civilization. Those who inhabit the northeast coast of Luzon hunt heads among themselves, but the only really grave problem which the people of this race present is that involved in seeing to it that they are not oppressed by their Filipino neighbors, on the one hand, and in preventing them from taking bloody revenge for past wrongs, on the other.

THE EFFECT OF A LITTLE SCHOOLING

The picture to the left shows a typical Ilongot girl as we found her. The picture to the right shows an Ilongot girl who has attended school for a time

The Negritos love music and dancing. They indulge in a monotonous crooning, varied with loud shrieks, which passes for singing. Their musical instruments are *gansas,* bamboo flutes, often played with the nose instead of the lips, and jews'-harps of bamboo. For hours at a time they keep up a monotonous circle dance, each performer having his forefinger hooked into the waistband of the skirt or clout of the person in front of him and walking, stamping, leaping into the air, or really dancing, as the humor strikes the leader of the performance, who sets the pace.

THE SUBANOS (SEE PICTURES, PAGE 1177)

The Subanos, or Subanun, inhabiting territory close to or on the coast of western and northern Mindanao are a partially Mohammedanized tribe long enslaved by the Moros, whose dress and customs they have adopted to a considerable extent, although they are not sea-rovers. They inhabit the Sibuguey Peninsula in Mindanao. The name means "river dwellers" and is applied to these people because they live at some distance from the seashore and are met with in ascending the rivers.

A considerable number of the people of this tribe have been Christianized and a still larger number have been converted to Mohammedanism. They are essentially an agricultural and a very peaceful people and fall ready victims to their more warlike neighbors.

For many years prior to the American

BANDAGING WOUNDED IFUGAOS

In the scrambles for carabao meat, of which the people of this tribe are so fond, a number of men always get badly cut. They greatly appreciate surgical aid. The wounded man is in this instance concealed by Secretary Worcester's assistant. Some 500 Ifugaos showed their appreciation of what was being done by gathering around and singing the Ifugao love songs (see pages 1198 and 1199).

occupation of the Philippines they were preyed upon by the Moros, who enslaved some of them and exacted tribute from others.

The people of this tribe build very large houses, which usually contain but a single room, although separate stalls may be made along its sides. The floor is usually somewhat raised in the vicinity of the wall, so as to make a convenient seat. The houses are built without windows, but the siding is light and can be readily displaced in order to admit light and air. There is often, also, a space between the top of the side walls and the roof. A platform or porch in front of the door is very common. Access to the house is usually had by means of a log of wood in which steps are cut. Small houses for storing rice are usually built near the dwelling-houses.

A CURIOUS ARTICLE OF FURNITURE

Their houses may contain almost nothing, but are often abundantly furnished with china plates, brass beetle boxes and trays, bronze gongs, and large jars, the latter being especially prized. The value of the furnishings may run into the thousands of pesos. Another article commonly found in the Subano houses is the *lantaka,* or brass cannon, which is obtained from the Moros and is kept as a valuable possession rather than for actual service.

The Subanos have some manufactures, making plain earthen jars, a variety of baskets, working metal in a primitive way, and manufacturing knives of a rude sort. The women weave with no little skill.

The agriculture practiced by these people is of a very primitive type. They usually content themselves with clearing away the forest, burning the ground over and planting the seed direct without further preparation of the soil. The crops commonly raised are rice and *camotes,* supplemented with such vegetables as squashes, peppers, tomatoes, and eggplant.

The sago palm, which grows wild, is

also a common source of food for them. They cultivate bananas and papayas.

When crops fail, the Subanos secure a fairly abundant food supply by hunting, fishing, and seeking edible roots and tubers in the forest.

Polygamy is universally allowed, but is by no means universally practiced. However, a prosperous man is likely to have three or four wives. Marriage is arranged by go-betweens. The ceremony is very simple. The couple eat together, giving each other morsels of rice, and that is about all there is to it.

It is claimed that polyandry (one woman having two or more husbands) is practiced more or less frequently among the poorer people living far back in the interior, but this fact has never been satisfactorily established. Divorce is allowed. It is arranged for by the local chief upon a proper showing of cause and the terms are settled at the same time.

The dress of the Subanos is similar to or identical with that of their Moro neighbors (see page 1177), and the same statement holds true for their ornaments, except that the women are given to wearing beads in large quantities, a custom which does not prevail to the same extent among the Moro women.

In appearance they are typical Malays.

The pagan members of the tribe are now estimated to number 30,000. I can find no reliable estimate of the number of those who have been Christianized or Mohammedanized.

THE TAGABALIES

The Tagabalies are another of the doubtful tribes inhabiting southern Mindanao and recognized by the Jesuits. They are said to occupy the region to the south of Lake Buluan as far as Sarangani Gulf and to be an unconquered people, warlike and hostile toward the neighboring Moros, Bilanes, and Bagobos, with whom they frequently fight.

I have never seen them.

THE TAGABAUAS

The Tagabauas are another one of the tribes of doubtful validity here listed. They are said to be a mixed people of Bagobo, Manobo, and Tagakaolo extraction, and to have the characteristics of these several peoples, sometimes side by side and sometimes confused with each other. They are further said to be few in number and to lead a wretched life.

I have never seen them.

THE TAGAKAOLOS (SEE PICTURE, PAGE 1180)

The Tagakaolos are the last of the tribes of doubtful distinctness here given recognized by Jesuits and some other authorities. They inhabit a part of the district of Davao, bordering on the gulf of the same name and extending from Casilaran Cove to a point a little below the River Lais; also one side of the little peninsula which ends in St. Augustine Point (see page 1180).

The Jesuits record no important facts concerning them, and I have seen them but once.

THE TAGBANUAS

The Tagbanuas are an interesting people inhabiting the interior of central and northern Palawan. They are also found on the neighboring islands of Dumaran, Linapacan, Culion, Busuanga, and a number of small islets. Their number is not accurately known, but has in the past probably been considerably underestimated. It is said that there are now 5,000 in the territory adjacent to the southernmost of the two Palawan rivers which bear the name Iuajig. There are perhaps an equal additional number in the country between this region and Puerto Princesa. How many inhabit the outlying islands we do not at present know.

The wild inhabitants of the interior of southern Palawan are locally known as Paluanes, but I cannot find that they differ in any essential particular from the Tagbanuas and consider this to be a case of two designations for one people.

The Tagbanuas are physically well developed. They are a dark-skinned people. Many of them have wavy or curly hair. I think it probable that they have in the past intermarried freely with the

A STREET IN AN IMPROVED BUKIDNON VILLAGE

"The most extraordinary results thus far achieved have been among the Bukidnons, where Lieutenant Governor Lewis has succeeded in converting rambling, ill-kept, foul-smelling *ranchérias* into the most sanitary towns in the Philippines" (see text, page 1251). "Nearly all the Bukidnon villages have well-attended schools and are connected with telephone lines, which are freely used. The people are converting their beautiful and naturally rich country into a checkerboard, with roads and trails for dividing lines. They are giving up their picturesque native costume so rapidly that typical garments are even now hard to obtain" (see text, page 1193).

Negritos, locally known as Batacs, and that the latter people have partly disappeared through fusion with them.

In the northern portion of their territory the men frequently wear the clout and the women the short skirt of the savage. Further south, where they have come in contact with Moros, they have adopted the dress of the latter people, sometimes in its entirety and sometimes in a more or less modified form. The men wear their hair long. As a rule, neither men nor women have ornaments save those which they can fashion for themselves from the products of their native forests. While most of them succeed in obtaining cloth, a not inconsiderable number clothe themselves in bark.

The Tagbanuas of southern Palawan are a fairly industrious people and have in the past raised rice enough to feed themselves and their parasitical Moro neighbors into the bargain. The government is just now for the first time succeeding in its efforts to protect them from the Moros and is establishing for their benefit trading-posts where they can sell their superfluous products and obtain what they want at reasonable cost.

The Tagbanuas are expert hunters and fishermen. There are no deer on Palawan, but in this island they display great skill in killing hogs, and in Culion and Busuanga they take deer in considerable numbers, bringing them down with bows and arrows, the use of which they have doubtless learned from the Negritos.

They are very fond of music and dancing. The instruments most in use are bronze timbrels, known as *ahgongs*. They also employ bamboo flutes. Some of their dances would hardly pass muster in polite society.

THE TINGIANS (SEE PICTURES, PAGES 1185, 1187, 1188, 1190, AND 1191)

The Tingians are in many ways the most attractive of the non-Christian Philippine tribes. Although all Tingians are non-Christians, we may divide them into civilized and uncivilized groups. The stronghold of the former is the subprovince of Abra, where they exist to the number of some 14,000. They also extend over to the east into the neighboring subprovince of Kalinga and to the west into the province of south Ilocos. A few have wandered south and have settled in western Lepanto. Another small group long since strayed into northwestern Pangasinan, where their living descendants have almost lost their tribal identity. But, curiously enough, those who wandered farthest from home and established themselves in the province of Nueva Ecija have retained almost unchanged their tribal dress, manners, and customs.

Many of the Tingians are round-faced and comparatively light-skinned. The men wear their hair long and hold it in place with small turbans or narrow head bands. The typical dress of the men is still the clout, but there are few who do not possess shirts and trousers. Nearly all of them have hats, chiefly made by themselves or their Ilocano neighbors (see page 1188). Not a few have even arrived at the dignity of shoes and stockings.

The women have until recently worn only skirts of clean, white cotton cloth when at work; but of late years short-sleeved *camisas* have come into general use, and many women are now rather ashamed to be seen without these upper garments. As a rule, they wear their abundant clean hair done up in a knot at the side of the head instead of at the back. It is wrapped in beads and produces a pleasing effect.

A CURIOUS IDEA OF BEAUTY

Their characteristic ornaments, of which they are inordinately proud, are a series of armlets made of beads, which begin at the hands and in the case of a wealthy woman extend to the shoulders. It is the custom for small girls to constrict their forearms by armlets tightly fastened half way between wrist and elbow, and to leave these in place as they grow, thus ultimately producing an hour-glass effect, which is increased by the swelling of the wrists which almost invariably results. Such unsightly deformed forearms are considered as ornamental by those immediately concerned as are

A MANOBO STREET, OLD STYLE

"The settlements of the Manobos on the Agusan River were until recently filthy and undrained. They swarmed with mosquitos and their inhabitants were, with few exceptions, victims of chronic malaria" (see text, page 1251)

A STREET IN AN IMPROVED MANOBO TOWN

"The condition of these villages is now greatly improved and some of them are really model settlements" (see text, page 1251)

A BUKIDNON PRESIDENCIA

The people of the subprovince of Bukidnon, in Mindanao, have showed a surprising willingness to come down from the mountains, settle in towns, and adopt the garb of civilization. Their villages are models of cleanliness and order, and they take great pride in building good houses. This photograph shows a *presidencia,* or municipal building, with the town officials in the foreground (see pictures, pages 1164, 1165, 1166, and text, pages 1160 and 1251).

small feet by Chinese women (see page 1185).

The Tingians are a kindly, gentle people, and the immaculate cleanliness of their persons and of their homes promptly commends them to the average American. Not only are their houses clean, but their cooking leaves little to be desired. It is said that a Tingian woman who serves her husband a mess of boiled rice which is dirty or even soggy exposes herself to danger of divorce. Immediately after each meal the cooking pots are taken to the river bank and scrubbed inside and out with clean water and sand, after which each is returned to its proper place in the kitchen.

The Tingians are supposed to be monogamous, but the rich men rather openly keep supernumerary wives or concubines, and their lawful wives do not seem to object to the practice.

Their houses are as good as, and often better than, those of Filipino neighbors with whom they rub elbows throughout most of the territory which they occupy. They are industrious farmers and raise horses and cattle in considerable numbers. Many of them are frugal, save their money, and become comparatively wealthy. They are a naturally pacific people, but when compelled to fight with savage neighbors in Kalinga and Bontoc have shown themselves able to hold their own.

THE WILD TINGIAN TRIBESMEN

The wild section of the tribe inhabits the subprovince of Apayao. They have commonly been called Apayaos, or Kalingas. There is certainly no fitness in the latter designation. Their language closely resembles the Tingian dialect spoken in Abra; their dress is said to be practically identical with that of the Tingians who inhabited Abra a century and a half or two centuries ago. The Span-

IN THE NEW HOSPITAL AT BONTOC

When the new hospital was built the number of patients requiring treatment was so great that they were very glad to accept temporary beds upon the floor until the furniture arrived.

INDUSTRIAL EDUCATION: TEACHING BUKIDNON BOYS HOW TO PLOUGH

A SCHOOL-HOUSE BUILT BY BENGUET IGOROTS AT KABAYAN (SEE PAGE 1251)

The school girls who appear in this picture are dressed in cloth woven by themselves

iards never succeeded in invading their secluded valley. They are said to number 53,000, although I am inclined to think this statement exaggerated.

The men are not only long-haired, but wear switches like the Bontoc women. They bind large turbans around their heads. Some of these are of light, indigo-blue cloth, but they greatly prefer fiery scarlet and gamboge yellow stripes. Their jackets are close fitting. Their clouts are very long and are wrapped repeatedly around the waist and abdomen (see pages 1187 and 1191). They tattoo black, cuff-shaped marks on the wrists and backs of the hands, but usually leave the rest of the body untattooed. On their breasts they often wear elaborate mother-of-pearl ornaments, and they particularly like to bedeck themselves with scarlet tassels.

NO CLOTHES AND NO BATHS DURING THE PERIOD OF MOURNING

The women are inordinately fond of beads, although they do not wear such elaborate arm ornaments as do their more civilized sisters of Abra. Many of them have silver ear ornaments of a form strictly peculiar to this region. Into their hair they frequently stick miniature head-axes, which serve both ornamental and useful purposes (see page 1191). Their dress consists of the usual short skirt and a well-made upper garment, which under ordinary circumstances they are careful not to remove in the presence of men. When widowed, however, they go stripped to the waist for a period of six months, unless their male relatives take a head within a shorter time, and they also refrain from bathing. They frequently starve themselves for long periods (see page 1185).

Courtship frequently lasts for two or more years, and meanwhile young men and young women are allowed to wander off together to neighboring towns without the slightest thought of the possibility of any improper conduct on their part. The confidence of the women is really touching.

I have had the daughter of a headman step, uninvited, into my boat when I was about to proceed up the Abulug River, and in reply to my surprised inquiry as to her purpose in joining the expedition have heard her ask rather contemptuously if I did not need some one to wash my clothes and cook my rice, later discovering that her father was showing his regard for and confidence in me by sending her along, unaccompanied, to attend to such matters.

I have had an attractive woman who wanted beads perch on my knee and pat my cheek in a most engaging manner. But if in consequence I had presumed to show the slightest familiarity with her the nearest man would have sent me to another, and let us hope better, world with promptness and dispatch! All in all, life, when one is traveling among the wild Tingians, is varied but never dull.

THE WILD MEN'S EXCELLENT HOUSES

These wild Tingians build admirably constructed houses—the finest primitive structures in the Philippines. I would give much to know where they got the plan which they invariably follow. The houses are closely grouped in villages, which are laid out in a fairly definite fashion, with a place for dwellings, another for granaries, and a third for the baskets in which they deposit when practicable the heads of their enemies. There is always a group of cocoanut trees and usually a group of the palms from the leaves of which they make raincoats. Usually there is also a group of cacao trees (see page 1190).

They raise rice and corn sufficient for their own use and grow tobacco for sale in the lowlands.

In frail boats or on tiny bamboo rafts they navigate with great skill the raging waters of the Abulug River.

They all have been, and I regret to say some of them still are, inveterate head-hunters. As yet they have been only partially brought under governmental control, and this work cannot be completed until the construction of trails makes their country more readily accessible.

They are fond of music and dancing, but are apt to over-indulge in *basi* on occasion, and some of the wildest scenes

I have ever witnessed have been at their feasts. Like the Benguet Igorots, they have an inordinate fondness for dog, and on several occasions I have avoided by a very narrow margin the necessity for sharing with them this dubious dish. Considerable progress is now being made in establishing friendly relations with them, and I hope and expect that within two years we shall be on as good terms with them as we now are with the Ifugaos, Kalingas, and Igorots.

THE TIRURAYES (SEE PICTURE, PAGE 1184)

The Tirurayes are a rapidly disappearing tribe inhabiting a region extending from the lower branch of the Cotabato River south to a point a little below the Trampadidu in southern Mindanao (see page 1184). They have been raided and enslaved by the Moros until they are completely cowed, and have become almost incapable of supporting themselves. In 1900 they were said by the Jesuits to number some 10,000 individuals, but they are believed to be rapidly dying off and will probably soon disappear. I have seen them only once.

OUR EARLY EXPLORATIONS

In previous articles written for the NATIONAL GEOGRAPHIC MAGAZINE I have given some account of several of the wild tribes inhabiting the Philippine Islands, more especially the head-hunting tribes; have briefly outlined the origin and nature of legislation enacted for their benefit, and have mentioned a few of the things which have been done since the American occupation to better their condition.* Within the limits of the present article I shall attempt to give a more comprehensive view of the results actually obtained.

Obviously it was useless to attempt to improve existing conditions until we at least knew what those conditions were, and during the period from 1901 to 1907 a large amount of exploration work was therefore necessary. Of this a considerable part had to be done on foot, as the so-called "trails" were in most cases mere foot-tracks made by the wild men, over which the tough and sure-footed Philippine ponies could not even be led (see pages 1203 and 1210).

Our usual method in penetrating the great unknown region west of the Cagayan River in northern Luzon was to start on the China Sea coast, climb the Cordillera at some feasible point, and descend on its eastern side. This meant traveling with very light baggage, so that we were ill-prepared for the marked changes in temperature experienced as we ascended and descended.

The fatigue involved was so extreme that we were usually more or less reckless by the time we had followed the streams on the Cagayan side of the Cordillera until they were sizeable enough to float bamboo rafts on which we could load ourselves and our belongings and then to intrust them to the tender mercies of the current (see page 1195). A laborious passage through some long, deep lagoon, where we had to pole our rafts or paddle them with bits of bamboo, would be followed by a shoot down a foaming rapid or a drop over a fall.

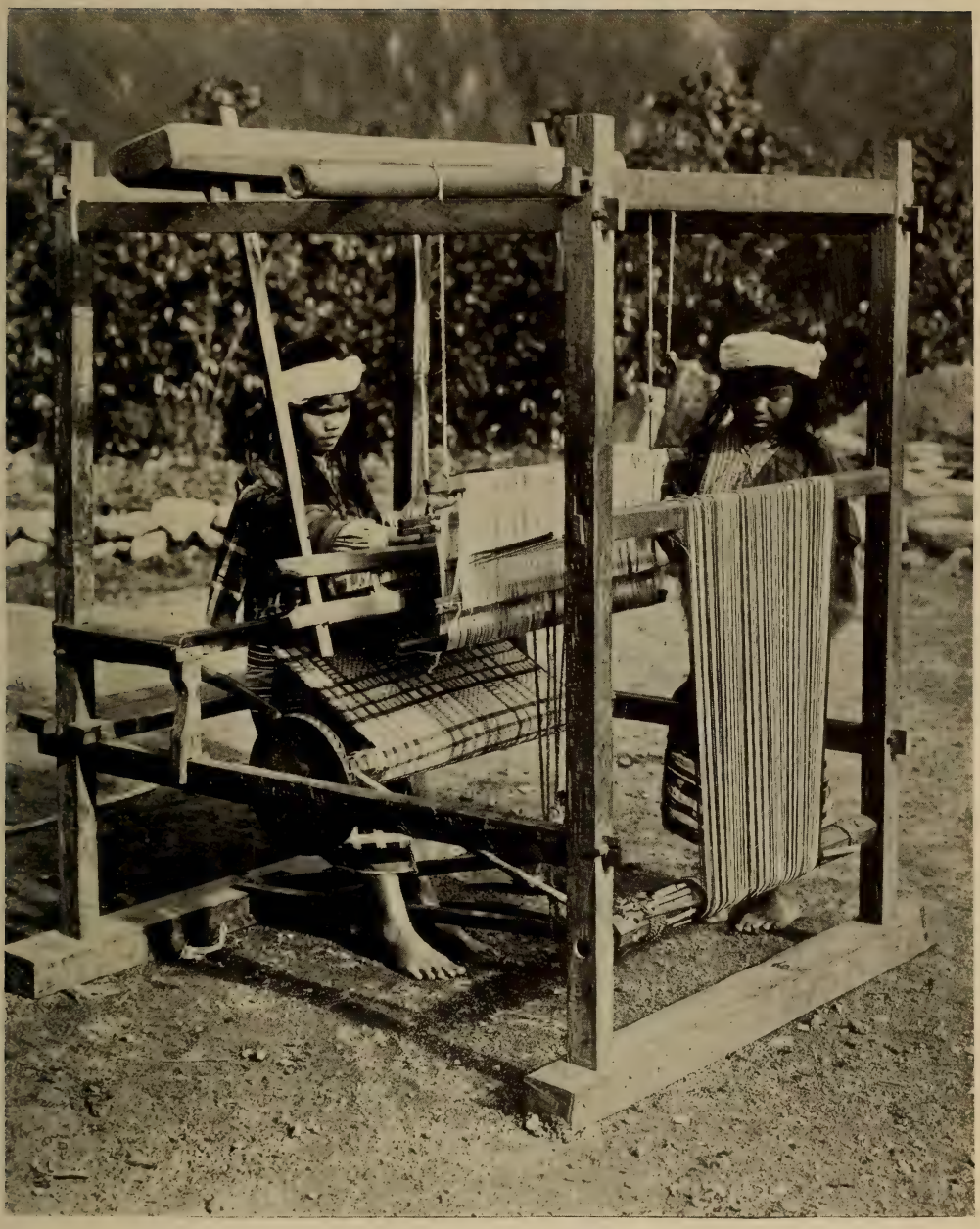
A bamboo raft 25 feet by 6 is unmanageable when once in the grip of the current, and we could seldom learn in advance what lay ahead of us. A sullen roar around a bend in the river might mean a swift and exciting rush down a foaming rapid to another deep pool, or it might mean sudden and prolonged immersion after a perpendicular drop.

Fortunately, a bamboo raft always comes to the top again, and if one hangs on he cannot drown. Unfortunately, such a raft goes to pieces if it hits a rock hard enough. Even then its component elements float; but there are drawbacks about being thumped against rocks by a raging current, although supported by a good, thick bamboo!

On one of my early trips four different rafts were dashed to pieces under me in two days, but I suffered no serious injury.

During 18 years of fairly continuous travel in the Philippines, in the course of which I have penetrated the territory of

* See NATIONAL GEOGRAPHIC MAGAZINE for March, 1911, and September, 1912.



BENGUET IGOROT SCHOOL GIRLS WEAVING (SEE PAGES 1238 AND 1251)

After these girls become skillful weavers they are given the looms which they have learned to use and are sent back to their own towns to teach others how to make cloth. The fabrics they produce are invariably of the brightest colors, but they display excellent taste in the way they combine them to produce a rich and striking effect. This can be seen by turning to the colored picture on page 1169.

IFUGAO BOYS SPLITTING ROCK

These little savages, previously absolutely without experience, learned in a few weeks to split, shape, and face rock for building stone

every tribe known to inhabit the Islands, I have never lost a man nor fired a shot, while those with me have never fired, with the sole exception of the occasion when my party walked into an ambush prepared for the provincial governor by renegade Moros on the west coast of Palawan.

On a number of occasions we should have been fully justified in opening fire, but we were determined to avoid this until the last possible moment, and it was with the result that in each case things took a turn for the better and we were spared the unpleasant necessity of falling back on brute force in order to protect ourselves.

Given a reasonable stock of good nature, a feeling of real friendliness toward the wild people, a few beads, some scarlet cotton cloth and brass wire, and, if one is in the Ifugao country, a goodly supply of narrow strips of white paper (see page 1218), and one may leave firearms behind and go far without danger of serious molestation.

OPENING LINES OF TRAVEL

The early exploration trips served to emphasize the fact that the establishment of feasible lines of travel was absolutely prerequisite to successful work among the non-Christian tribes which, with the exception of the Moros, inhabit mountainous regions in the interiors of the larger islands. Perhaps the most important thing which we have done was the opening up of such lines of travel, without which little could have been accomplished.

At the outset we had a bit of costly experience in building trails of too high grade, which were promptly destroyed by the action of water during torrential rains. Fortunately our lesson was not long delayed, and we soon discovered that in a country where 38 inches of water have been known to fall from the heavens in 24 hours the cost of maintaining a short high-grade trail between two points is so much greater than is that of maintaining a much longer low-grade trail that the original greater expense of constructing the latter is very soon more than overbalanced.

In the special government provinces coming under my administrative control I did not permit the construction of trails with a grade of more than 6 per cent except under extraordinary conditions and for short distances, and even then 10 per cent was the high limit (see page 1208). On account of limited funds the trails are built narrow at the outset, but are rapidly widened, in connection with maintenance work, until they become passable first for narrow-tread carts and then for carts of ordinary size. Any of them can promptly be converted into carriage or automobile roads by widening and surfacing.

We now have more than 1,000 miles of cart roads and trails in the Mountain Province alone, to say nothing of long stretches in the province of Nueva Vizcaya and the subprovince of Bukidnon. Work has begun in Mindoro, Palawan, and the subprovince of Agusan. Resthouses have been built at convenient intervals as required.

THE WONDERFUL SCENERY OF THE MOUNTAIN PROVINCE

It is now possible to make in perfect comfort a most wonderful horseback trip through the Mountain Province, on which one sees magnificent tropical vegetation (see page 1205) and the oaks and pine trees of the temperate zone; wild men who have always been peaceful agriculturists and wild men who until very recently have been active, and still are potential, head-hunters; mountain scenery of unsurpassed beauty (see pages 1198 and 1206), and a thousand and one things each of which makes its own strong appeal. This extraordinary opportunity is sure to be taken advantage of, and it will be but a few years until the Bontoc Igorot is hammering out headaxes for the tourist.

When I laid down on the map the general route for a main trail from Baguio, in Benguet, to Claveria, at the extreme northern end of Luzon, I did not expect to live to see it constructed. I now believe that within a year it will be possible safely to ride a spirited American horse from Baguio to Claveria without dismounting. Numerous important branch

BUILDING STONE SPLIT AND CUT BY YOUNG IFUGAO BOYS

trails have already been completed and others are under way. Deep streams and gorges are at the outset crossed by aërial "flying ferries," which are later replaced by permanent bridges (see pages 1214 and 1215).

It is a significant fact that we have never had a man murdered on one of our finished trails. The wild men have come to appreciate highly the safety and ease of travel over them and are glad to aid in their construction.

The law imposes on every able-bodied man in the special government provinces the obligation of working 10 days annually on public improvements, which usually means roads and trails or of paying a tax of one dollar; but power is vested in the Secretary of the Interior to exempt people who have not advanced sufficiently in civilization so that it seems desirable to impose this burden upon them.

It has been my policy always to pay cash for trail work at the start, and to impose the public improvement tax only after the wild men were themselves able to appreciate its benefits and were willing to pay it. The people of the hill tribes make sturdy laborers, moving earth in large quantities and showing especial ability in handling rock.

The dry stone retaining walls which they constructed are admirably built. They soon learn to handle sledge and drill, and a number of them have become quite skillful in the use of powder and dynamite.

SOME PRACTICAL RESULTS OF ROAD AND TRAIL CONSTRUCTION

The necessity of working side by side has often resulted in the establishment of friendly relations between old enemies. The cost of living has been materially decreased in the wild man's country by the improvement in means of communication, while the exportation of his surplus products has been greatly facilitated. As the result of recent road work we expect to reduce by about one-third the cost of salt used by the 123,000 people in the subprovince of Ifugao during the present year.

Another very important result is the enormous increase in the efficiency of the government police force. Ugly head-hunting towns become peaceful and law-

abiding when it is possible for the soldiers of the Philippine constabulary to drop in on them at 2.30 a. m., for the wild man does not like to be obliged to take to the hills at night when the *anitos,* or spirits of the dead, are astir.

POLICING THE HILL COUNTRY WITH WILD MEN

A noteworthy feature of the work for the establishment and maintenance of a good state of public order has been the use of the wild men for police duty. Bontoc Igorots and Ifugaos have been enlisted in the Philippine constabulary, and the people of both tribes make splendid soldiers (see pages 1222 and 1224). They are tireless on the march; they are obedient, loyal, and brave.

As they are familiar with every footpath and are not hampered with trousers or shoes when on the march, they cover their territory rapidly and completely when occasion demands. They are far less likely to commit abuses than Filipino soldiers would be, for they are dealing with their own people, while Filipinos would be dealing with people whom many of them dislike and despise.

The Ifugaos are born riflemen, and Ifugao soldiers have repeatedly come off victors in rifle matches when competing with Filipino soldiers. It would be entirely feasible to recruit and to train at small expense a force of Bontoc Igorots, Ifugaos, and Kalingas, which would defend the hill region of northern Luzon with deadly efficiency and could be employed effectively in the lowlands should occasion demand.

THE ADMINISTRATION OF JUSTICE

The administration of justice among such an aggregation of tribes, where might had always been right and where acts which civilized men consider criminal had been regarded as creditable and virtuous, has naturally involved many embarrassments. Some of the tribes had their own specific methods of administering justice and their own peculiar ways of detecting the guilty.

With the Mangyans there was a test by fire. A person accused of theft or other serious crime was compelled to grasp a piece of hot iron, which, it was supposed, would not burn him if he was innocent. If a piece of iron was not readily available, the suspected criminal was required to snatch a stone out of a boiling pot of water.

Among the Tagbanuas, when there were conflicting statements from two witnesses, both were compelled to dive into a deep pool of water and remain under as long as possible. It was held that the man who came to the top first was the liar.

With the Bontoc Igorots bamboo lance-heads were placed slanting upward, with their points pressing against the skin at the backs of the heads of witnesses who had contradicted each other, and then at the word of command each lance-head was driven vigorously between the scalp and the skull by a smart blow with a stone. The lance-heads were then pulled out and the man who bled least freely was held to have told the truth!

If the wild man knew of courts at all he had only fear of them, for in the old days he never went to court unless compelled to do so by some member of a Christianized tribe, and then he invariably lost.

From the early days of the appointment of American governors the wild men have come to them to have their difficulties settled, having soon learned to have an abiding faith in the honesty and fairness of these officials. This naturally led to the conferring of specific authority on the latter in order that their decisions might have the force and effect of law.

All governors and lieutenant governors of special government provinces and subprovinces are now justices of the peace, with jurisdiction throughout their respective territories. In general we have refrained from going into ancient history, and have informed the wild men that as far as concerns the past we shall let bygones be bygones, but that in future murders and other crimes will be severely punished.

Thus far they have displayed an unanticipated willingness to allow their troubles to be settled in court; but justice as

STONE WORK DONE BY IFUGAO BOYS

At Quiangan a stone school-house is being built by Ifugao boys, who have cut, faced, and laid the stone. This photograph also shows the boys who did the work and the American who taught them to do it

A SCHOOL-HOUSE AT BONTOC

Most of the stone and brick was laid by Bontoc Igorots

previously administered by them had at least an advantage in that punishment for evil doing was *prompt,* and they have naturally been impatient over the law's delays. The only complaints they have made relative to sentences have been that they were not severe enough, the Supreme Court of the Philippines having thus far commuted nearly all death sentences imposed on wild men.

ONE METHOD OF OBTAINING SWIFT JUSTICE

Last year a Bontoc Igorot policeman shot and killed the Igorot *presidente* of Tinglayen, a former head-hunting town, whose inhabitants are particularly warlike. There was no excuse for the act of the policeman, which was nothing less than an unprovoked murder. Some of the more unruly inhabitants attempted to kill him, but he was defended by the better element, including a famous fighting chief named Agpad, and the son of the man who had been shot, on the ground that the government had undertaken to kill evil-doers, and that this murderer *must be turned over to the government to be killed!*

They were, however, anxious for prompt action, and feeling that the self-restraint which they had shown entitled them to it, I arranged for a special session of court at Bontoc. Immediately after the hearing of the case had been completed, the judge asked the lieutenant governor of Bontoc whether the latter official thought there was any particular reason why he should not delay his decision in the case. The lieutenant governor replied that he thought there was. The judge rather indignantly inquired what that reason might be; whereupon the lieutenant governor led him to the window and showed him some 500 Tinglayen warriors, armed with shields, head-axes, and spears, standing on the hillside just outside the court-room and quietly awaiting the verdict. The judge's decision was rendered without delay!

The frankness with which guilty wild men tell the truth is sometimes rather appalling, and their ideas as to right and wrong are calculated rudely to shock the unitiated.

OUR JUSTICE NOT ALWAYS COMPREHENSIBLE TO THE WILD MAN

A wild Tingian named Abaya, of Apayao, had a so-called *comisionado,* or

A BRICK-YARD OPERATED BY BONTOC IGOROTS

All of the bricks for public buildings at Bontoc, the capital of the Mountain Province, are now burned, and most of them are laid, by wild men

agent, who sold his products for him at the provincial capital of North Ilocos. The *comisionado* in turn had a Negrito slave, whom he suspected of designing to escape. When Abaya came in with a back load of tobacco the *comisionado* directed him to take his head-axe and kill the slave, who was cutting firewood in a neighboring grove. The *comisionado* further told Abaya that he himself would kill a big hog and give him half of it in payment for his services. Abaya cheerfully sought out the unsuspecting Negrito, whom he attempted to decapitate with a terrific blow.

The Negrito jumped in the nick of time and the keen edge of the head-axe struck his shoulder instead of his neck, inflicting a dreadful wound. Why he did not drop in his tracks and die no one can explain, but in point of fact he ran away so fast that his would-be executioner could not catch him.

When Abaya returned from an unsuccessful pursuit, he was immediately arrested on a charge of attempted murder and incarcerated in the provincial jail.

On being brought before the judge and interrogated as to whether he had tried to kill the Negrito, he stated that he had made an honest and earnest attempt to carry out the instructions of his *comisionado,* as it was his custom to obey the "authorities!" He further strenuously insisted that he was not to blame for the Negrito's escape, arguing that any ordinary well-regulated man would have died promptly, even of such an injury as he had managed to inflict, and that it was no fault of his that the Negrito had displayed such extraordinary vitality. He further said he had done all in his power to run the Negrito down; that he was guiltless of any intention to let him escape, and was merely the victim of an unprecedented and unforeseeable combination of circumstances!

What was the judge to do in such a case? What he *did* do was to give Abaya the minimum penalty under the law for having afflicted *lesiones graves* (serious injuries) on the Negrito.

When I secured his pardon some time

later, he still believed that he had been in prison for failing to kill the Negrito!

Such primitive conditions are, however, rapidly becoming things of the past. The wild man has yielded with unanticipated readiness to what he doubtless regards as the peculiar prejudices of his American rulers.

HEALING THE SICK

The healing of the sick and injured has now begun to play an important part in the civilization of the non-Christian tribes. It is practicable to protect the hills of northern Luzon from invasion by contagious disease originating in the lowlands on account of the ease with which land quarantine can be successfully maintained; and, although cholera has three times sneaked over the boundary line of the Mountain Province, it has in each case been promptly driven back.

Systematic vaccination is now rapidly decreasing the mortality from smallpox, which has in the past been a dreadful scourge among the hill people. The belief that the *anitos,* or spirits of the dead, cause sickness, wounds, and death has been prevalent among them, and their method of seeking to obtain relief from their ailments has been to sacrifice chickens, pigs, or cattle, according to their means; but they have been quick to grasp the fact that the white man's method is vastly better.

There is a well-equipped modern hospital at Baguio, in the subprovince of Benguet, and Igorots sometimes travel 100 miles to get to it. There is also a hospital at Bontoc, a well-equipped modern building, which has recently replaced a temporary hospital established some years ago. The clinic at this place is increasing by leaps and bounds.

A horrible disfiguring disease known as "yaws" is quite prevalent among the hill people and causes them much suffering. Dr. Richard P. Strong, director of the Biological Laboratory at Manila, discovered the fact that Ehrlich's "606" was an absolute specific for this infirmity.

Subsequently a man badly afflicted with it was found at Barlig, one of the wildest settlements in Bontoc. He declined to go to the hospital for treatment and was sent there in charge of an Igorot deputy sheriff. He received the necessary injection, but during the first two or three days complained bitterly that no medicine was being put on his sores. Then he suddenly became convinced that the medicine he *had* received was "very strong." Within a week he was running around town and triumphantly displaying his rapidly healing body to every one who would look. Then he suddenly and unaccountably disappeared, only to reappear a little later, bringing with him for treatment every man, woman, and child of Barlig who had yaws!

Relievable eye troubles are frightfully prevalent among the hill people. Indeed, until after the American occupation the law of the survival of the fittest did its work, absolutely unimpeded, throughout this whole region, and every year many thousands of people were permanently incapacitated or died needlessly.

HOW AN IGOROT DISCOVERED CHRISTMAS PRESENTS

The pleasant thing about our efforts for the relief of suffering is that they are highly appreciated. Sanitary Inspector Barron nursed the only son of a rich, influential old Benguet Igorot chief named Palasi through a vicious attack of confluent smallpox and saved the boy's life. Palasi was anxious to pay him, but the provincial governor refused to permit this, because the inspector was paid by the government for doing just such work.

Nine months later, just before Christmas, Palasi appeared at Baguio and called on the governor. He said that he had heard of a strange American custom and wished to learn more about it. He asked if it was true that Americans gave presents to their friends at Christmas time. Being answered in the affirmative, he inquired further whether it would be right for the Igorots to adopt this good American custom.

Having been told by the unsuspecting governor that it would be highly proper, he stated that he was going to make Mr. Barron a Christmas present of his best horse, which he did!

A BAND OF BUKIDNON BOYS

Here is a fine example of the kind of educational work that is being done in the Philippines. When the boys, shown in the picture, first came to school not one of them knew a note of music; now this band can play any variety of music, from rag-time to light opera

I myself, in the course of my journeys among the wild men, have been compelled to prescribe for every conceivable ailment and have done quite a bit of "jack-knife" surgery (see page 1230). Were I a young man and possessed of adequate knowledge of the science of healing, I would ask for nothing better than to be a physician to these people. One would not grow rich at it, but he would certainly be an uncrowned king.

Medical and surgical work are now being inaugurated in the province of Agusan, where a temporary hospital will soon be replaced by a permanent one, and where, as in the Mountain Province and Nueva Vizcaya, this work will exert a potent influence in maintaining and extending the friendly relations now existing with these people, in the absence of which we could not accomplish a tithe of what is actually being done for their betterment.

SANITARY WORK

Sanitary work among the wild men is beset with difficulties. The savage is usually glad enough to have one relieve his sufferings, but in many cases he strenuously objects to one's compelling him to clean up his premises or his person.

In this regard there are wide differences between the several tribes. The Negritos are not far above the anthropoid apes, and the Ilongots and the Mangyans have advanced but little beyond the Negritos. The Bontoc Igorots are filthy, and while Governor Pack, of the Mountain Province, insists that the Benguet Igorots are just *naturally dirty* rather than filthy, I venture to disagree with him. The Ifugaos are comparatively clean. The Kalingas are more so. The Tingians are one of the cleanliest peoples in the world. Improvement among the Benguet Igorots is now very noticeable.

The settlements of the Manobos on the Agusan River were until recently filthy and undrained. They swarmed with mosquitos, and their inhabitants were, with few exceptions, victims of chronic malaria. The condition of these villages is now greatly improved and some of them are really model settlements (see pages 1234 and 1235).

The most extraordinary results thus far achieved have been among the Bukidnons, where Lieutenant Governor Lewis has succeeded in converting rambling, ill-kept, foul-smelling *rancherias* into the most sanitary towns in the Philippines, leaving little room for further improvement (see page 1232).

PRACTICAL SCHOOLS FOR THE WILD MEN

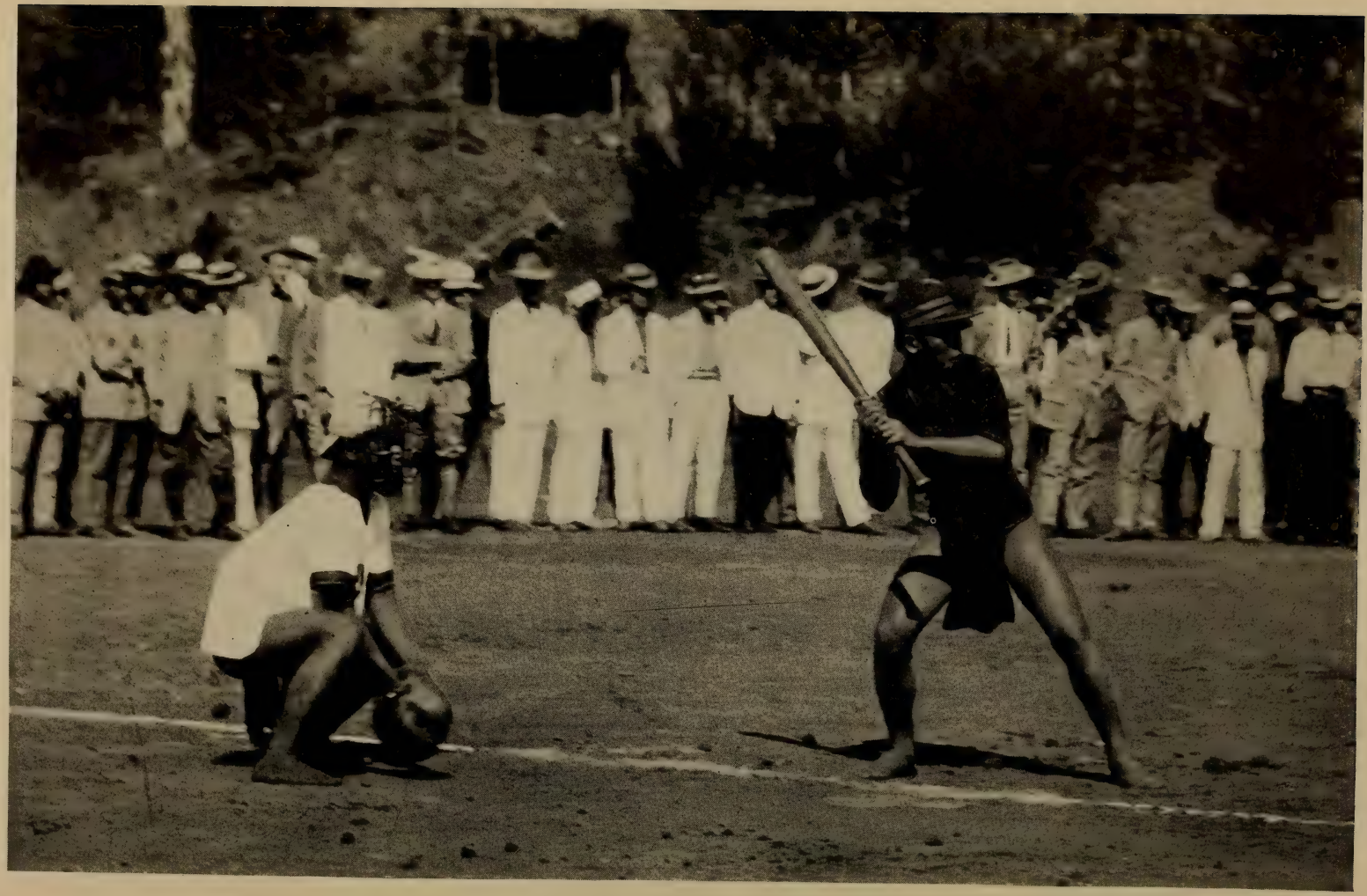
School work began promptly as soon as the wild man's territory was made accessible and reasonably safe. It has been vigorously prosecuted ever since with varying success. So far as my knowledge and information go, every effort thus far made to educate the Negritos has failed utterly. In my opinion, success cannot be hoped for.

These people are born nomads of very low intelligence, and all that we can hope to accomplish for them is to restrain their mischievous, and occasionally criminal, tendencies, and at the same time to protect them from injustice and oppression at the hands of their neighbors. This is being done with a reasonable degree of success in Bataan, Zambales, Pampanga, Pangasinan, and Apayao. Nothing has as yet been done for the Negritos of the east coast of northern Luzon, who are abundantly able to protect themselves, nor for those of Panay and Negros.

English is taught in all schools. For the Benguet Igorots there are schools affording to both boys and girls practical industrial training, which not only furnishes them necessary mental discipline, but increases their wage-earning capacity. Many of the Benguet towns already have secretary-treasurers, educated in the schools of this subprovince, who can read, write, cipher, and keep books. Girls are taught to weave cloth on simple looms and are then allowed to take the looms home with them (see page 1241). They soon teach others this valuable accomplishment.

INDUSTRIAL TRAINING A MARKED SUCCESS

Among the Ifugaos the limited amount of work now in progress is also largely



AN IGOROT BASEBALL GAME IN PROGRESS

"I have not previously mentioned what I believe to be the fact, that baseball is one of the really important things which the Bureau of Education has taught the boys. . . . These games serve to bring the people together and result in endless good" (see text, page 1253)

industrial. Boys are taught woodwork, at which they excel; stone splitting and cutting, at which they are very skillful (see pages 1242, 1244, and 1246), and iron work, in which they are very much interested. Girls are taught to weave and sew.

Neither in Lepanto nor in Bontoc have educational results of any material importance been obtained as yet, but the recent adoption of a sensible policy involving the laying of great emphasis on industrial training leads me to believe they may be looked for in the near future.

There is one quite successful school among the Ilongots, and here again industrial work is the principal thing taught.

If nothing more were accomplished than to persuade these especially filthy little savages to clean up, the work would be worth while. As a matter of fact, they display a wholly unanticipated degree of intelligence.

No educational work has as yet been inaugurated among the Kalingas or the wild Tingians of Apayao, but good schools were long since established for the civilized Tingians of Abra, who have already greatly profited by them.

The Bukidnon people of Mindanao were most anxious for schools, and one of the potent arguments used in persuading them to come down from the hills and to settle in organized villages was that if they failed to do this it would be impossible for us to provide schools for their children. Every little Bukidnon village has built a good school-house and a dwelling for the schoolmaster, and the children are making extraordinary progress.

In a number of cases it has proved better to establish boarding-schools for the boys and girls of a non-Christian tribe rather than to attempt to send schoolmasters into extremely isolated places, where they would find it difficult to secure proper food and would suffer greatly from loneliness. Such a school has been established for Tagbanau boys at Aborlan, in Palawan, and should meet with a large degree of success.

THE WILD MEN TAKE TO BASEBALL

In a previous article I have referred to the beneficial results which have followed from the introduction of field sports among the adult wild men of northern Luzon, but I have not previously mentioned what I believe to be the fact, that baseball is one of the really important things which the Bureau of Education has taught the boys.*

It is really wonderful to see how they take to the game and how it brightens them up and increases their activity and alertness. Keen interest is taken not only by the boys themselves, but by their fathers and mothers, in competitive games between different settlements. These games serve to bring the people together in a friendly way and result in endless good (see pages 1252 and 1255).

THE WILD MEN PROTECTED FROM DANGEROUS INTOXICANTS

Prohibition of the use of intoxicants other than those which he himself manufactures and has always been accustomed to employ is one of the greatest boons conferred on the wild man by the government. A Filipino seldom becomes a victim of alcoholism. He may take an occasional drink of vino, tuba, or beer, but he almost never drinks to excess. In this regard the wild man differs radically from him.

There are tribes among whom it is hardly good etiquette to leave a *fiesta* sober. Only fermented drinks are made by these people, the chief materials used in their manufacture being rice, corn, the juice of sugar-cane, and that of several different species of palms. These drinks are for the most part comparatively mild, and must be guzzled in large quantities in order to produce advanced intoxication.

When these people, accustomed to nothing stronger, drink bad ino or worse whiskey to great excess the results are shocking. They promptly get so drunk that the whole universe apparently seems to reel around them. At all events, they obviously think that they have to hang on to the grass in order to stay on the ground! I have repeatedly known indi-

* See "Field Sports Among the Wild Men of Luzon," March, 1911, NATIONAL GEOGRAPHIC MAGAZINE.

viduals to kill themselves outright by overindulgence in the white man's strong liquor.

Furthermore, a wild man who has once developed a taste for it will work to get it when nothing else will induce him to work. It became known to me that unscrupulous persons were taking advantage of this weakness to sell bad liquor to the wild men in large quantities and to secure them as laborers at small expense.

I am not a believer in the enactment of prohibitory legislation which cannot be enforced; but it happens that conditions as to transportation are such, in much of the mountain territory, as to render it comparatively easy to prevent the importation of liquor, and since the desirability of doing so was evident, I drafted and submitted an act which has been successfully enforced with very gratifying results. In the Agusan Valley, for instance, the chief transportation business a few years since was the shipment of *vino up* river. Today the principal transportation business is the shipment of *hemp down* river.

OPIUM NOT USED

The use of opium is at present practically unknown among the people of the non-Christian tribes except the Moros, and with the existing prohibitory legislation we should, theoretically, be able to keep it so. Unfortunately, the facility with which opium can be smuggled is so great as to render legislation prohibiting its use largely farcical, and until the evil is checked by limiting production in the countries where the drug is grown its use will inevitably continue to spread.

AS TO CLOTHES

No efforts have been put forth to persuade the wild people, other than school children, to adopt the garb of civilization. This will surprise, and may even shock, many good people who have grown up in the belief that there is an intimate and necessary relationship between the clothing of the human body and morality in sexual relations. Such people will be still more surprised to learn the hard fact that the morality of a number of the almost naked tribes of the Philippines is, in such matters, far above that of any civilized nation in the world; and that, curiously enough, some of the most fully clad Philippine wild tribes fall farthest below the ordinary standard of civilized peoples.

Furthermore, it is a sufficiently well-known fact that the health of men who have been accustomed to wear only clouts is often prejudicially influenced when they don shirts or trousers.

We have therefore been content to let the inevitable change come about gradually, and I, at least, have regretted the rather rapid disappearance of some of the more striking and attractive of the native costumes.

When the wild man acquires clothes, he usually begins at the top and works downward. A hat is the first article purchased; then comes a shirt or coat; then shoes. Trousers are donned last of all, if at all.

When the boys' school at Baguio was opened, the pupils were fitted out with natty blue uniforms. Shortly afterward I met six of them returning to Baguio after spending Saturday and Sunday at home. They were wearing their caps and coats, but their trousers were suspended from the ends of sticks carried over their shoulders!

For some reason the idea gained prevalence among the Benguet Igorot *presidentes* of towns that their official position required the adoption of civilized dress, but they nevertheless complained bitterly that trousers *tired* them, and requested vacations from time to time in order that they might retire temporarily from public life and take off these uncomfortable garments.

When on my earlier trips through the Luzon Mountains I was slipping and sliding over water-worn rocks and scaling cliffs with shoes worn out, feet torn and bleeding, and life and limb consequently imperiled, I envied my wild companions the tough natural sole leather on the bottoms of their bare feet. It never wore out, seemed impervious to cuts, and, aided by prehensible toes, gave

A BASEBALL TEAM OF BENGUET IGOROT BOYS

the savages a far surer foothold than the most perfectly constructed hobnailed shoes could possibly afford a white man.

GOVERNMENT EXCHANGES

In the old days the wild man was invariably shamefully cheated when he attempted to barter the products of his native mountains with his "Christian" neighbors in the lowlands for salt, cloth, steel, and similar necessary articles. Furthermore, it was part of the game to get him intoxicated in order that he might the more easily be robbed; and this, combined with the tendency of the sudden change in climate involved in descending from the mountains to the lowlands to bring out malaria, often produced fatal illness. At the best he was usually compelled to sell his produce at a small fraction of its true value and to pay three or four prices for everything that he bought.

With a view to remedying this situation, we have established a number of so-called "exchanges," which are nothing more nor less than government shops, where the wild man may purchase at a fair price the things which he needs and may sell his produce at its real market value. He may also sell his weapons and other manufactured articles if, as is often the case, they are of a sort which can subsequently be sold to civilized residents of the Philippines or to tourists.

The result is that many of the wild men can purchase what they want in their own country at reasonable prices, and can dispose of what they have to sell without being cheated. They are quick to take advantage of the opportunity thus afforded, and their willingness to work increases proportionately to their desire to purchase the goods which are displayed at the government exchanges.

With the average wild man life is one long struggle to get sufficient food for himself and his family. One of the things which we are endeavoring to do is to

show him how he can accomplish this result with greater certainty and less exertion. We are also gradually bringing about the raising of coffee, cacao, and similar crops, which can bear the heavy cost of transportation to the coast and still be sold at a profit.

The people of Bukidnon, many of whom lived on rich and fertile plains, actually believed that it was *necessary* to go to the forest-clad mountains and clear away the trees in order to get ground on which food products could be raised. The introduction of a few disc plows, with the necessary work animals, soon demonstrated to them that the splendid prairie soil at their very doors would produce far larger crops than they had been able to get on the mountain sides with all their hard work.

Now the plows are kept going night and day through the greater part of the year. In one town, where a plow arrived in advance of the cattle to pull it, 15 men promptly hitched themselves to it and kept it moving until the work animals arrived!

In my opinion, Rizal's dictum that the future of the Philippines lies with the people of the mountains is likely to prove a true saying. Their courage, loyalty, and industry are admirable qualities on which to build, and if the "fair-deal" policy which has been inaugurated is steadily adhered to they will go fast and far.

I have purposely omitted all reference to the great work that has been done in the Moro Province, which makes a story by itself. It is a story of surpassing interest, and it ought to be told by some one of the many men who have played an important part in the work. I myself have had no direct connection with it.

The men who are entitled to the lion's share of the credit for what has been done for the non-Christian tribes of the Philippines under American rule are the provincial and subprovincial officials, who, in the face of innumerable and apparently insuperable obstacles, have carried on their country's work with dogged persistence and unfaltering courage, content to do the right thing *because it ought to be done*. A Kipling would find abundant material in the life of any one of them for a true story of absorbing interest, but no one of them would thank him for telling such a story.

If through the medium of this article I succeed in conveying to some of their countrymen even a vague idea of the task which they have undertaken and of the success they have achieved, I shall be more than satisfied.

VOL. XXIV, NO. 12 WASHINGTON DECEMBER, 1913

THE NATIONAL GEOGRAPHIC MAGAZINE

RELIGIOUS PENANCES AND PUNISHMENTS SELF-INFLICTED BY THE HOLY MEN OF INDIA*

BY REV. W. M. ZUMBRO

HEAVEN is established on the air, the air on the earth, the earth on the waters, the waters on truth, the truth on the mystic lore (of the sacrifice), and that on *Tapas!* (penance or self-mortification).†

Four miles from Madura is the rock of Tirupurankundram (Hill of the Holy God Puran), sacred to the god Subramaniam. Here, twice a year, thousands of worshipers from all over South India gather for a religious festival.

These festivals serve the triple purpose of a camp-meeting, a country fair, and a market; for the Indian devotee combines business with religion in an interesting way.

It is a gay throng that assembles, rich in bright colors, fascinating in its varied life and movement—the easy pose of the village youth, the quaint charm of the Indian maiden, the confused babel of voices. Here is a little microcosm of the great India.

On the west the rock rises 500 feet sheer above the plain on which it stands, while it slopes away more gradually toward the east. On the top of the rock is a Mohammedan mosque and at the foot is the temple of Subramaniam.

It is two miles around the rock, and every one going to the festival must needs walk around the rock, always going from left to right like the hands of a watch.

THE RELIGIOUS ASCETIC AND HIS PENANCES

These great religious assemblies would never be complete without the religious ascetic or *Sadhu*. Here one sees him in full power, crowned with glory and honor.

In addition to the professional mendicant, who sits quietly behind a cloth or a skin spread on the ground to receive the offerings of the faithful, there are many serious ones, who have made a vow to do some act of penance or self-torture in honor of the God, or in return for some favor, or to acquire merit, or for some other reason. Burying one's self in a standing position until only the head remains above ground (see page 1281), walking on iron spikes, dancing and carrying a *"kavadi"* on the shoulder (see pages 1259 and 1278) or a heavy load on the head (see page 1280), rolling in the dust and heat around the rock (see page 1291), stooping over every few feet until the fingers touch the ground—this latter by women (see page 1296)—these are some of the familiar forms of penance to be seen here.

* In the preparation of this article the author would acknowledge special indebtedness to "Oman's Mystics, Saints, and Ascetics of India"; also to Farquhar's "Primer of Hinduism." A number of other books have also been consulted. Acknowledgment is also made to those who have been good enough to supply photographs.

† Artareya Brahmana, XI, 614, quoted on page 243 in Hopkins' "Religions of India."

Photo by W. M. Zumbro

THE SACRED ROCK AND TEMPLE AT TIRUPURANKUNDRAM

"Four miles from Madura is the rock of Tirupurankundram (Hill of the Holy God Puran), sacred to the god Subramaniam. Here, twice a year, thousands of worshipers from all over South India gather for a religious festival. . . . On the top of the rock is a Mohammedan mosque and at the foot is the temple of Subramaniam" (see text, page 1257).

Photo by W. M. Zumbro

COMBINING RELIGION AND BUSINESS

"These festivals serve the triple purpose of a camp-meeting, a country fair, and a market, for the Indian devotee combines business with religion in an interesting way. It is a gay throng that assembles, rich in bright colors, fascinating in its varied life and movement. . . . Here is a little microcosm of great India" (see text, page 1257).

Photo by W. M. Zumbro

A YOUTHFUL PILGRIM

Sometimes, at pilgrimages, a little boy is seen carrying a *kavadi* (a heavy, decorated frame of wood) in the fulfillment of a vow made by his parents. Notice the different sect marks worn by the bystanders on their foreheads (see pages 1272 and 1273).

In India the ascetic with his self-inflicted torture is ubiquitous. He wanders everywhere, from the snowy Himalayas to where the quiet waters of the Indian Ocean break in ripples on the shore at Cape Comorin. You find him in the streets of the great city going from door to door begging a handful of rice for his daily meal; he will stop for days in the shady grove by a quiet river or in a cave in the mountains. You find him in the lonely desert or in the deep forest living the life of a hermit until death overtakes him or he is eaten by wild beasts.

Oftentimes he will establish himself under a shady pepul tree near a village and by some act of severe penance attract the attention of the people, who soon come in great numbers to see him. These *Sadhus* come from all ranks of life and from all hereditary castes; they represent every shade of religious habit and opinion—philosophical or speculative.

THE EMBLEM AND RELIGIOUS IDEAL OF A NATION

The foreigner hurrying through India rarely understands or appreciates these *Sadhus*. He looks upon them as droll fellows or simpletons, knows little of their subtle philosophy, and sees only the body clothed in white ashes, dirt, and rags, or the self-torture by which they seek to gain release.

The *Sadhu*, sitting unmoved by sun or rain, regarding not heat or cold, light or darkness, the pangs of hunger nor the ties of family, bathing betimes, his thoughts turned within, his gaze centered on the tip of his nose in meditation, is the fitting emblem of the people, as he is their most cherished ideal.

Asceticism, self-torture, and penance are by no means limited to India; they are found in various forms in all lands, amongst all peoples. The founder of Buddhism was an ascetic. Christianity

Photo by W. M. Zumbro

WALKING AROUND THE ROCK AT TIRUPURANKUNDRAM, MADURA

"On the west the rock rises 500 feet sheer above the plain on which it stands, while it slopes away more gradually toward the east. . . . It is two miles around the rock, and every one going to the festival must needs walk around the rock, always going from left to right like the hands of a watch" (see text, page 1257).

Photo by W. M. Zumbro

THE PILGRIM'S MORNING BATH

Before making the circuit of the rock, it is incumbent on each pilgrim to bathe in the great tank near its foot. Almost every act of the Hindu's religious life is prefaced by some water ceremony, either a complete bath or a ceremonial ablution

Photo by Wiele and Klein

CARE FREE AND DEBONAIR

In other countries incorrigible idlers degenerate into vagrants, who are often a danger to the community. In India they can pursue a more decorous course and become honored ascetics.

Photo by Johnston and Hoffman

THE TRADE-MARK OF THE ASCETIC

Almost all ascetics can be recognized as such by the possession of the so-called begging-bowl. This term is somewhat of a misnomer, for few of the ascetics actually condescend to beg; but most of them carry an alms bowl—often a mere cocoanut shell or a calabash—as a reminder to the faithful that to contribute to the support of a holy man is one of the best ways of acquiring merit.

Photo by Wiele and Klein

A DEVOTEE OF SIVA

Many of the ascetics present a most fantastic appearance. Nothing could be more extraordinary than the costume of the *Sadhu* shown in this picture. His face entirely smeared over with white ashes, his girdle of bells, the ropes of *rudraksha* berries around his neck and arms, the weird head-dress, the iron staff in one hand and the begging-bowl in the other, render him to Western eyes more like a clown than a holy man.

Photo by Johnston and Hoffman

WEARING THE SACRED THREAD

All Brahmins, the members of the highest caste in Hinduism, wear a knotted thread of twisted cotton over the left shoulder and under the right arm. A great number of *Sadhus* discard all clothing but the scantiest of rags. The one in the picture certainly cannot be accused of displaying any wordly passion for fine raiment. Those who adopt this extreme simplicity of attire protect their skin from the sun's rays and insect pests by a liberal coating of ashes.

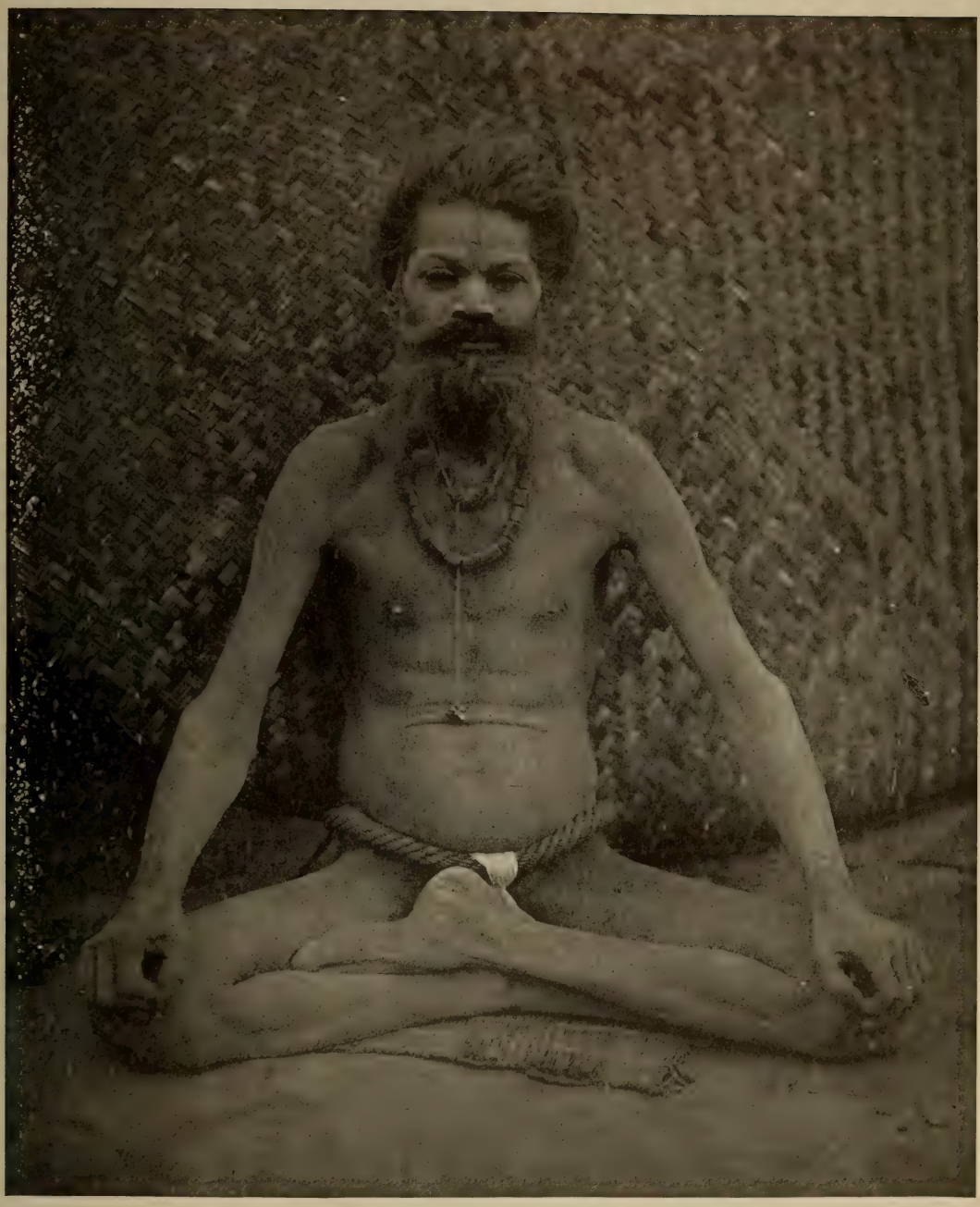


Photo by Johnston and Hoffman

A YOGI

The term *yogi* cannot be applied indiscriminately to any ascetic, for it is limited to those who practice *yoga* (union), a complicated system of philosophy which aims at attaining union with the Supreme Being. This the Hindus believe can be obtained by complete abstention from all worldly objects and by intellectual concentration, accompanied by various postures, breathings, and rules of diet, which vary considerably with different systems of *yoga*.

Photo by Wiele and Klein

ANOTHER TYPE OF YOGI

The *yogi* has been accepted in the West as the typical representative of the religious ascetic of India, but such is far from being the case. He seldom practices any of the more horrible forms of self-torture, but is intent only on obtaining knowledge and various occult powers, especially vision into the past and future.

Photo by Mazumdar

YOGI BISHUDHANANDA SWAMI

The title Swami, which literally means lord, is often bestowed upon teaching *yogis* of eminence. Here we have the portrait of a teaching *yogi* of some fame in India. In recent years the *yogi* and his doctrines have attracted much attention, both in Europe and America. Perhaps the most famous case is that of Sri Ramakrishna, a *yogi* who lived near Calcutta, whose doctrines were preached with great fervor in this country by the late Swami Vivekananda.

Photo by Hands and Son

AT HOME ON AN ASH HEAP

Here we see an ascetic putting into actual practice the old Hindu saying: "It is not exertion, but inertion (*vairagya*), which is the path to liberation." This man hopes to obtain freedom by incessant meditation on the attributes of divinity while lying motionless upon his ash heap.

had its St. Simon Stylites, the Syrian saint who spent 37 years sitting for the most part on the top of a high pillar set up in the ground, enduring the scorching heat by day and the biting frost by night, that he might overcome evil passions and be nearer heaven.

While penance is found in other countries, there is no country in the world where it has become so universal or is carried to such a degree of intense suffering as in India. Every form of self-mortification is practiced. An arm is held upright for years, until the tissues wither and it becomes impossible ever again to bring the arm down to a normal position (see pages 1290 and 1306); long journeys are taken walking on sharp spikes; or one will for years sit by day and sleep by night on a bed of thorns (see pages 1268 and 1269), or roll hundreds of miles in sun and storm, through dust and mud, from the eastern seas to the holy Benares (see page 1284).

Others will hang for half an hour at a time by the feet, head down, over a smouldering fire (see page 1295), or sit, surrounded by five fires, through the blistering heat of an Indian summer day (see page 1286); others load the body with heavy chains until flesh and blood sink under the heavy load, or swing on poles at religious festivals by a flesh-hook fastened into the muscles at the back, though this last has now been forbidden by the British government (see pages 1310 and 1311).

What lies back of all this suffering, and why will men voluntarily torture themselves with a torture equaling in ingenuity and cruelty any prescribed by Inquisition or by primitive savage?

Photo by Mazumdar

"THE BED OF THORNS"

This is a very common form of self-torture and is said to be very efficacious in subduing the weaknesses of the flesh. After a little practice, lying on one of these beds of spikes is by no means as uncomfortable as it looks, and the modern ascetic has all sorts of cunning devices to mitigate the discomfort of his position. The *Sadhu* in the picture has coiled his hair till it forms a neat turban about his head.

Photo by Johnston and Hoffman

ANOTHER PRICKLY COUCH

The "thorn couch" of the ascetics, or *kantaka-sayya,* is said to have originated as follows: Bishma, one of the heroes of the Mahabaratha, while engaged in battle was covered all over by the innumerable arrows discharged at him by Arjuna, and when he fell from his chariot he was upheld from the ground by the arrows, so that he lay on a couch of darts. Bishma, like Saint Sebastian, recovered from the effects of the arrows, but he claimed that the experience had a salutary influence upon his soul's health.

Photo by W. M. Zumbro

BABY'S BED OF THORNS

So great is the belief in the efficacy of mortification that even small children are occasionally made to practice it. Here we see a mother who, for his soul's health, has deposited her baby son upon a bed of thorns. It will be noticed that the young ascetic does not preserve the stoic demeanor of his older brethren.

The very spirit of the East, its subtle philosophy, the incarnation of its deepest desire, the product of its age-long effort, all are embodied in the Indian *Sadhu* and his self-inflicted penance.

The motive lying back of *Tapas*—self-torture — has, however, changed from time to time. In the times of the Rig Veda, when the Aryan tribes had settled in the western Punjab beyond the Indus, various forms of self-torture were endured, with a view to securing warlike prowess, invincibility, miraculous powers, magical charms. Poets, sages, martial heroes, demigods like Arjuna and Rama, are credited with ascetic practices; even the gods themselves underwent self-inflicted tortures for the attainment of the object of their desires.

The late Prof. Sir Monier Williams wrote as follows:

MAKING INEXHAUSTIBLE DEPOSITS IN THE BANK OF HEAVEN

"According to Hindu theory, the performance of penances was like making deposits in the bank of heaven. By degrees an enormous credit was accumulated which enabled the depositor to draw the amount of his savings without fear of his drafts being refused payment. The power thus gained by weak mortals was so enormous that gods as well as men were equally at the mercy of these all but omnipotent ascetics." *

In the Mahabaratha there is a story of two brothers, Daityas of the race of the great Asura, who undertook a course of severe austerities with the momentous object "of subjugating the three worlds." "They clothed themselves in the bark of

* Indian Epic Poetry, footnote, page 4.

Photo by Dr. W. E. Grubl

MEASURING THEIR LENGTH

A common practice among Hindu pilgrims in making the circuit of sacred places is to do so by a series of prostrations. Taking a stone in one hand, they prostrate themselves at full length, with arms extended, leaving the stone to mark the measure of their length; then, rising, they walk to the spot marked by the stone and make a second prostration, and so on until they have reached their starting place. As some of the circuits are several miles in extent, the exertion involved in this act of devotion can be imagined.

trees, wore matted hair, besmeared themselves with dirt from head to foot, and in solitude upon the lone mountains endured the greatest privations of hunger and thirst. They stood for years on their toes with their arms uplifted and their eyes wide open. Not content with these sore penances, they, in their zeal, cut off pieces of their own flesh and threw them into the fire.

"The Vindhya Mountains, on which these determined ascetics had placed themselves, became heated by the fervor of their austerities, and the gods, beholding their doings and alarmed for the consequences that might ensue, did everything in their power to divert them from the strict observance of their vows. The gods tempted the brothers by means of every precious possession and the most beautiful girls, but without success. Everything failing, Brahma was at last compelled to grant them very extensive powers and privileges, including complete immunity from danger except at each other's hands.

"When these successful ascetics returned home they arrayed themselves in costly robes, wore precious ornaments, caused the moon to rise over their city every night, and from year's end to year's end indulged in continual feasting and every kind of amusement. Evidently there was no thought of sin or expiation, nor did any regard for virtue enter into the consideration of the objects kept in view by these resolute Daitya brothers.

"The idea seems to be that those who practice austerities, whoever they might be, appropriate energy, as it were, from some universal store and they are thus

Photo by Wiele and Klein

A WORSHIPER OF SIVA

The three stripes of sacred ashes rubbed across the forehead and arms of this *Sadhu* brand him as a worshiper of Siva. A member, with Brahma and Vishnu, of the supreme Trinity of the Hindu pantheon, Siva is worshipped under three aspects. First he is the destroyer, and then the restorer. In Hindu thought he may be said to typify the destructive and recreative power of nature. In his third aspect he is the great ascetic and miracle worker who accomplishes his results by meditation and penance. He is also god of the arts,

Photo by W. M. Zumbro

AN ASCETIC FOLLOWER OF SANKARACHARYA

Sankaracharya, who was born about 789 A. D., was one of the most profound and influential of Hindu theologians and reformers. He taught the existence of a supreme God and systematized the philosophy of the Vedas. So great was his learning that he came to be regarded as an incarnation of Siva; and, though he died when only 32 years of age, he has exercised and still exercises a potent influence on Hindu thought. Note that the *Sadhu* in the picture wears the *trifundra*, or three ash lines of Siva, on his forehead.

Photo by Wiele and Klein

THE FOREHEAD MARKS SERVE AS THE INSIGNIA OF DIFFERENT HINDU SECTS

The *Sadhu* in the picture wears the *trifula,* the distinguishing mark of the Ramat sect. It consists of three lines drawn upward from the bridge of the nose, the central line red and the outer ones white. These triple lines are emblematic of the three gods of the Hindu Trinity: the central red line represents Vishnu, the preserver; that on the right, Siva, the destroyer; while the third stands for Brahma, the creator.

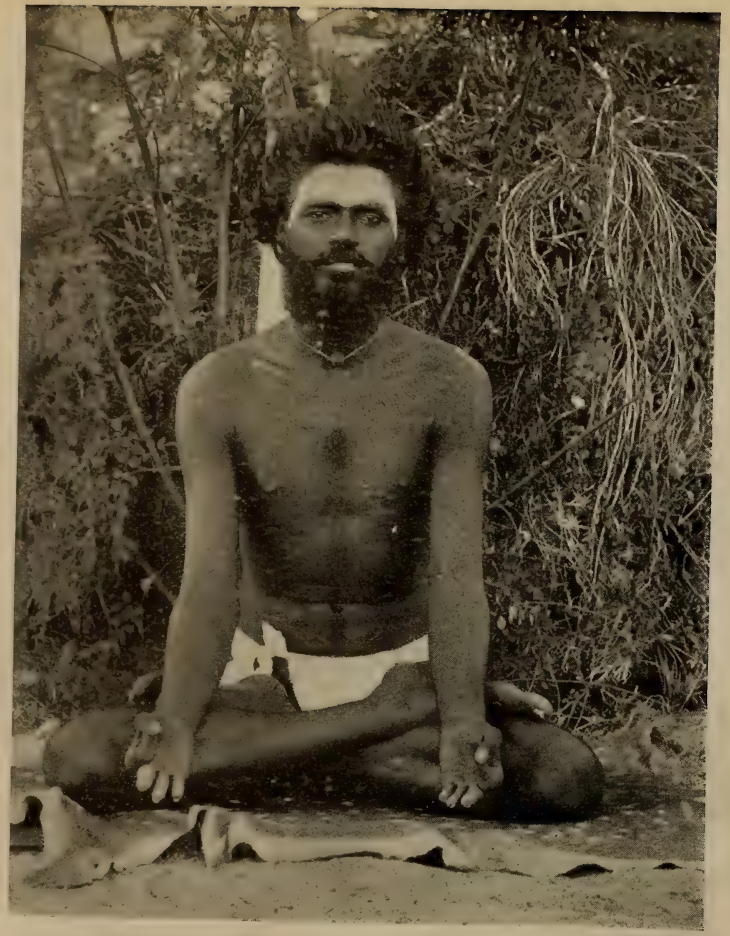


Photo by Arumanayagam

A YOGI IN THE FOREST

Here we have a typical example of a man engaged in the practice of *yoga*, or soul culture. Note the carefully adopted posture, the crossed legs and the circle formed by the thumb and forefinger of each hand. Many *yogis* who have attained enlightenment are active teachers who draw crowds of disciples to the forest where they have taken up their abode, and among these teaching *yogis* many profound philosophers can be found.

Photo by W. M. Zumbro

ROYAL PROCESSION LEAVING A CITY

Bas-relief from a Buddhist tope at Sanchi, representing the Buddha driving out of the city on that memorable day on which, after meeting an old man, a beggar and a cripple, and thus discovering the existence of evil and pain for the first time, he became an ascetic.

Photo by W. M. Zumbro

A WOMAN ASCETIC

Although men of every caste and every sect in Hinduism are found in the ranks of the ascetics, the number of women who give up the world is extremely small. When, however, a woman does adopt this method of obtaining freedom from what Kipling calls "The Wheel," she occupies a position of the highest respect (see page 1296).

Photo by W. M. Zumbro

A SADHVI

Sadhvi is the name given to a female ascetic. These, though rare among the Hindus, are common enough among the Jains. This is curious, in view of the fact that among the Jains the members of one sect totally deny the possibility of a woman attaining salvation. The followers of another sect, however, admit that such a thing is within the bounds of possibility, and naturally it is to this sect that the women ascetics give their adhesion.

PILGRIMS AT BENARES

Photo by Johnston and Hoffman

All the world over, pilgrimages to the sacred places have been recognized as conferring a mysterious grace upon the participant. In no land is the pilgrimage more common than in India, and no city possesses a greater sanctity than Benares. To acquire full merit the pilgrimage should be made afoot, but modern railways have sadly curtailed the observance of this godly tradition.

An eastern proverb says: "The most austere hermit is often the most consummate rogue." The rogue in the picture pretends that both his legs are cut off at the knees and he has bloody cloths wrapped round them to prove it. His real legs are safely ensconced in a pit beneath him, while the stumps he exhibits are sticks wrapped up in old cloths.

Photos by W. M. Zumbro

The rascal in the picture has one leg doubled up so as to appear as if it were cut off, while the other leg, carefully covered, is extended to an unusual length by means of a stick

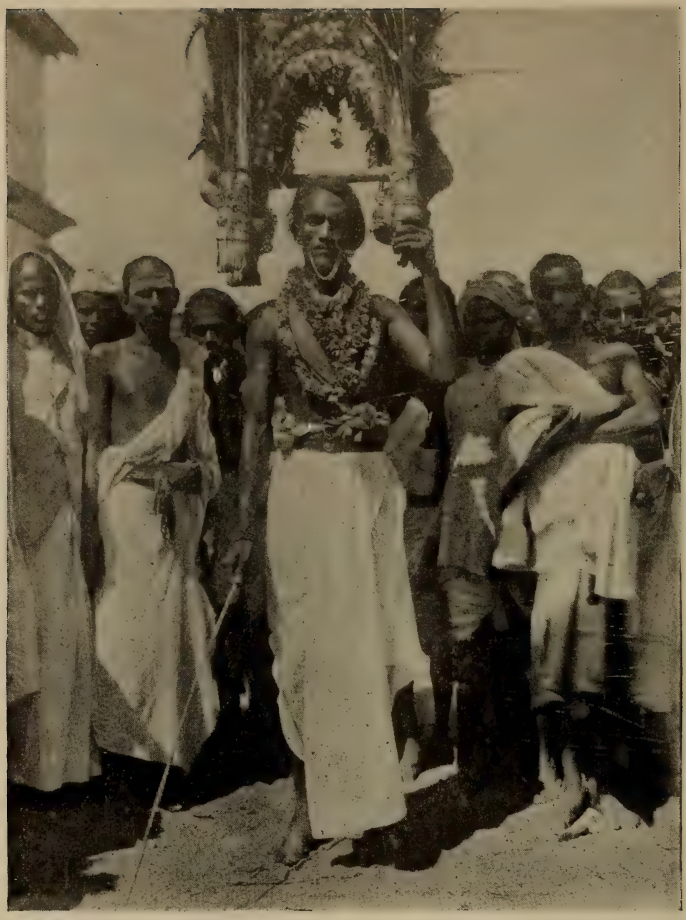


Photo by Rev. W. P. Elwood

CARRYING THE KAVADI

Carrying a *kavadi* around the sacred rock is a favorite penance in southern India. The *kavadi,* a wooden frame elaborately decorated with flowers and feathers, is held above the head by one hand. Note also another form of penance, the iron chain beneath the chin supported by a pin driven through the cheeks from side to side.

strengthened to work their will, whether for good or ill." *

Another story is that of the titanic old-world conflict between Vasishta and Visvamitra. In this story King Visvamitra, in order to overcome his rival, underwent the most terrible tortures, maintaining absolute silence, suspending the breath for hundreds of years. "As he continued to suspend his breath, smoke issued from his head, to the great consternation of the three worlds. The gods, rishis, etc., being alarmed, addressed Brahma, stating that if the great *muni* were not stopped he would destroy the three worlds by the force of his austerities. Said they: 'All the regions of the universe are confounded; no light anywhere shines; all the oceans are tossed and the mountains crumble, the earth quakes, and the wind blows confusedly. We cannot, O Brahma, guarantee that mankind shall not become atheistic.' "

During the period of the Brahmanas, ending about 600 B. C., we find ascetics living in the forest. They are called *Vanaprasthas,* forest-dwellers. They wore coats of bark or skin, wound up their hair in matted coils, and lived largely on woodland fare. They practiced various methods of severe austerity, enduring extreme cold and heat, strange food,

* Oman in "Mystics, Saints, and Ascetics."

Photo by W. M Zumbro

DANCING AT THE FESTIVAL

Dancing is a special feature of Indian worship and is often strenuous. The man in the picture danced three times around the rock of Tirupurankundram, a distance of some six miles, carrying this heavy ornamented wooden frame on his shoulders. Note the garlands of flowers around his neck and the rings on his toes.

Photo by W. M. Zumbro

A PENANCE AT TIRUPURANKUNDRAM

Among the pilgrims will be found many persons who, while not professional ascetics, are vowed to some act of penance while visiting the sacred rock. Sometimes it takes the form shown in the picture, of carrying a heavy load on the head while making the circuit of the rock.

Photo by Dr. W. E. Grubl

BURIED ALIVE

One of the most extraordinary practices indulged in by the ascetics is shown in the picture. The devotee buries himself in the ground until only the nose and the upper part of the head are exposed, and he often remains in this curious position for weeks at a time. This is regarded as a feat of heroic sanctity and may always be relied on to produce abundant offerings from the admiring laity.

Photo by Weile and Klein

WITH HIS IRON STAFF

Among many races iron is believed to have the virtue of scaring away dangerous and evil spirits. As a protection against more substantial enemies—wild beasts, for example—the iron staff carried by the majority of ascetics ought to be effective.

Photo by W. M. Zumbro

A DEVOTEE OF VISHNU

It is usually easy to distinguish between the followers of the gods Vishnu and Siva accordingly as they favor beads of the holy basil wood or the rough berries of the *rudraksha* tree. This *Sadhu* being a devotee of Vishnu, wears beads of basil wood (see page 1263).

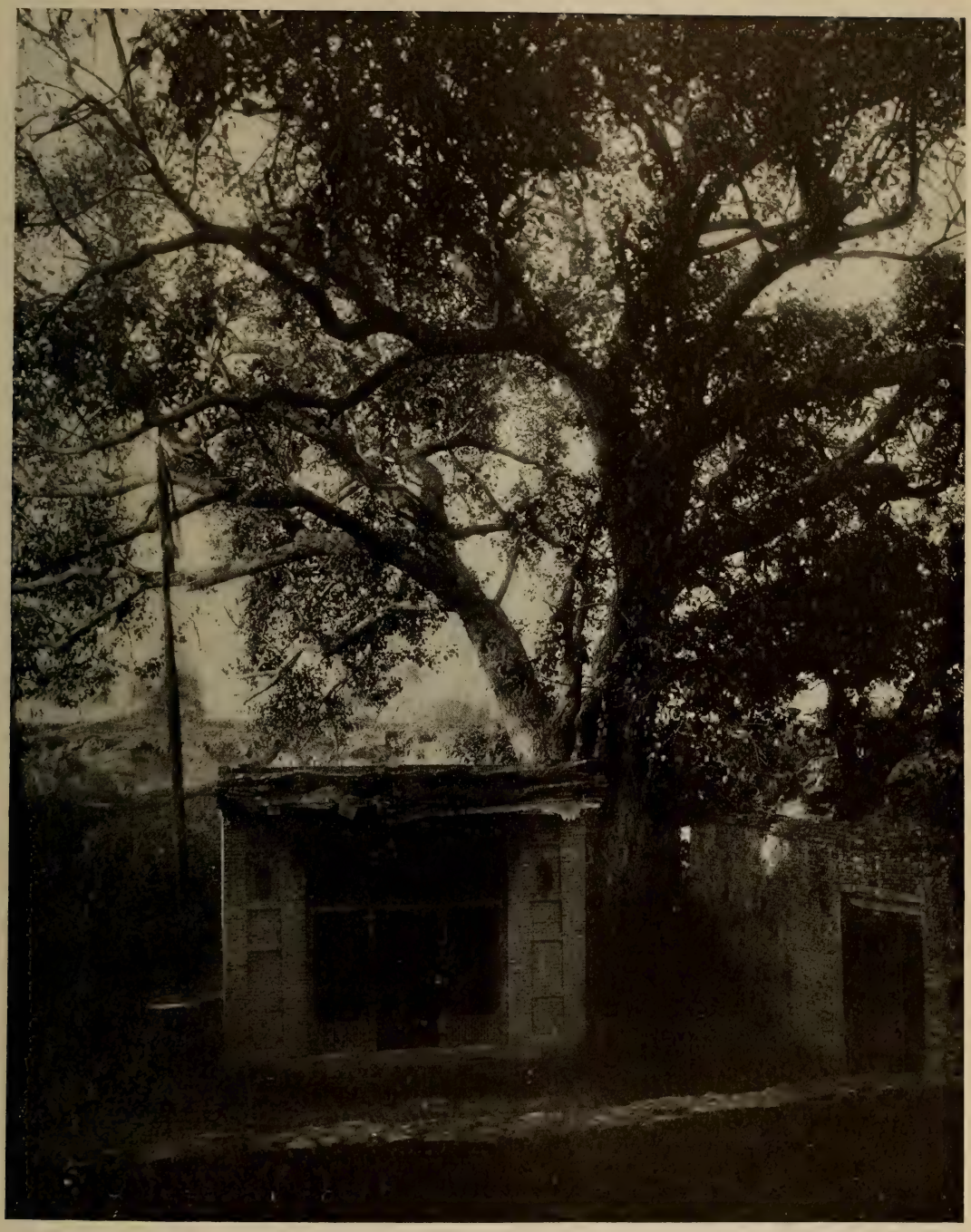


Photo by Johnston and Hoffman

THE HOME OF AN ASCETIC

An ancient Hindu maxim, quoted by Hopkins in his "Religions of India," says: "Let the ascetic live in a deserted house or at the foot of a tree . . . here, in his mind, pursuing knowledge." The dwelling shown in this picture fulfills both of these conditions.

Photo by Rev. W. P. Elwood

ROLLING HIS WAY TO THE SHRINES

Some pilgrims roll their bodies on the earth for hundreds of miles, from their homes to distant shrines, up hill, down dale, and through the village streets. Everywhere traffic gives way so that the pilgrim may have every opportunity of rolling his way to salvation. In this way some particular sin may be expiated, but many adopt this means of obtaining money to build a temple, dig a well, or even to provide a daughter's dowry.

painful postures. The purpose in their austerity was still in the main the attainment of miraculous power, but moral aims began also to appear.

THE TWO VITAL DOCTRINES OF HINDU THEOLOGY

In the period between 600 and 480 B. C. a marked change comes over the life and thought of the people. The two philosophic doctrines of *Re-incarnation* (rebirth) and *Karma* (retribution) were developed. A man's body, character, birth, wealth, station in life, happiness, or sorrow came to be regarded as the just recompense or reward for his deeds, good or bad, in earlier existences. If one could cease from acting he might then hope for release from the necessity of rebirth. One could cease from action only by crushing out desire. A great passion for release arose and many went out to the mountains and sought by indescribable self-torture to reach the end of birth and sorrow.

In later times there came about a still further development of Hindu philosophy. Each man was regarded as made up of an individual soul, a subtle invisible body, and a gross body. The soul is of the same essence as the all-spirit, from which it is detached in some mysterious way, and the final goal is reunion with the all-spirit.

On the other hand, the soul is united with the subtle body, and by birth the subtle body becomes incarnate in a gross body, by which it is greatly modified. The impressions made upon the subtle body by its association with the gross

Photo by W. M. Zumbro

LIVING ON A WIRE

As a thoroughly comfortless method of existence, few can surpass that adopted by the *Sadhu* in the picture, who spends nine-tenths of his time balanced on a slack wire in the forest. Most Indian ascetics wear strings of beads about their necks or carry rosaries in their hands, reminding one that it is from the East, probably during the time of the Crusades, that Christendom borrowed this aid to devotion.

body so affects its nature that even after the separation through death the taint of the gross body still remains, and this inevitably brings about the reincarnation of the subtle body along with the soul; but, for the soul, rebirth is a most terrible hardship. Escape is possible only provided the subtle body is freed from the influence of the senses, weaned from the affections and desires of earthly life.

The release may be obtained in two ways: (1) by reasoning with the soul, persuading it to believe that the undue attraction for the body cannot conduce to happiness, for the body does not endure forever; (2) by mortification of the body, thereby preventing the soul from deriving any pleasure from its union with the gross body.

MANY ASCETICS ARE NOT INSPIRED BY LOFTY MOTIVES

It should not be thought, however, that such complex philosophy lies back of all or most of the self-inflicted penance of the present-day *Sadhu*.

Sometimes a man will cut himself in a belief that his enemy will be made to feel the pain equally with himself, or he will undergo torture in order to bring ruin on his enemy whom he could not ruin in any other way.

It also happens that the path of the ascetic is one of the surest paths leading to wealth and fame. In India heroic contempt of pains and pleasures has always commanded the wondering attention and respectful homage of the multitude. Very well, then; a man intent on

Photo by Rt. Rev. Bishop of Lucknow

THE ORDEAL OF FIRE

One favorite mode of mortifying the flesh is to sit under the pitiless glare of the Indian sun surrounded with small but fierce fires

Photo by Rev. W. P. Elwood

DEVOTEES PARADING THROUGH THE STREETS BEARING GREAT EARTHEN POTS FILLED WITH FIRE, AT THE MARIAMMAN FESTIVAL, PALANI

fame inflicts cruel torture upon himself; soon he becomes an object of veneration; his fame spreads abroad; miracles are attributed to him; money and food flow in; or it may be that spiritual pride and vanity inspire the sufferer.

A man deeply affected by world-weariness, one upon whom the tedium of existence presses hard, those upon whom sorrow, want, and misery bear heavily, those discomforted in the world strife or subject to domestic disappointment, or disillusionment, in the West these sometimes find relief in suicide; in India, in asceticism.

Buddhist and Jain, Hindu and Mohammedan, all still feel the impulse that 2,500 years ago drove forth the Indian ascetic, bare-headed, bare-footed, naked, or nearly so, and during all these centuries has kept them wandering, sometimes without any reliance on or belief in God, mortifying the flesh, and all in order to secure cessation from the evils of rebirth, wandering ceaselessly, sometimes blamelessly, while generation after generation has come and gone, nations risen, decayed, and vanished. It is a source of ceaseless wonder.

THE INFLUENCE OF THE SADHU ON INDIAN LIFE

What has been the result of this 2,500 years of painful asceticism?

Under the old régime, before the days of the post-office and railway and telegraph, these wandering ascetics were news-carriers from one part of the country to another. Ideas which might be fermenting in one locality were carried by them to other localities.

Politically the influence of the *Sadhu* has been against the development of a healthy, national life. His detachment from human interests, his philosophic outlook upon life as an evil, a delusion unworthy of serious consideration, has worked against any serious effort for the development of a strong political organization and has made India an easy prey to the despoiler.

From the religious standpoint his theory as to the efficacy of austerities and his belief in the necessity of separa-

Photo by S. C. Worman

LONG NAILS A SIGN OF HOLINESS

In the West we are at great pains to keep our nails short and trim; in the East equal pains are taken to encourage their growth to the greatest possible length. With finger-nails five inches long, it is, of course, impossible to work, but that is the last thing expected of a *Sadhu*.

Photo by Weile and Klein

USING AN ARM REST

Among the *Sadhu's* implements will be noticed the T-shaped chin and arm rests, known as *bairaguns*. These instruments are adapted to the various positions favored by the ascetic when silently engaged in his profound and pious meditations.

Photo by Rt. Rev. Bishop of Lucknow

THE ORDEAL OF THIRST

Here, by the bank of the river and beneath two great jars of water, sits an ascetic who seeks enlightenment by the practice of meditation and thirst. With water in abundance within easy reach, he limits himself to the minimum amount necessary to sustain life. Note the T-shaped arm-rest.

Photo by W. M. Zumbro

This man's hands have been kept for so long in this position that they can never again be brought back to a natural attitude. He is therefore entirely helpless and has to be fed like a baby. "While penance is found in other countries, there is no country in the world where it has become so universal or is carried to such a degree of intense suffering as in India. Every form of self-mortification is practiced" (see text, page 1267).

Photo by Hands and Son

Many ascetics, when beginning their search after righteousness, take a solemn vow to continue for life in one unvaried posture. This *Sadhu* has adopted the uplifted arm, and after a few years it will wither and die, so that it will be impossible for him to lower it. "'The idea seems to be that those who practice austerities, whoever they might be, appropriate energy, as it were, from some universal store and they are thus strengthened to work their will, whether for good or ill'" (see text, page 1271; also page 1306).

Photo by W. M. Zumbro

THE ROLLING PENANCE

One of the most common forms of penance is that of rolling the body on the ground, often for very great distances. The man shown in the picture is rolling around the sacred rock at Tirupurankundram.

tion from the world and its pleasures in order to secure the ineffable joy of union with the Divine has helped to keep the heart of India turned away from the commercial and material things of life and has helped to hold India true to its deep religious nature, has exalted in the minds of the people the excellence of the spiritual over the material.

It has held in abeyance every spirit of inquiry and has prevented the rise of the scientific spirit, since it looks upon all phenomena as illusion, and holds that true knowledge is to be gained only by contemplation and austerities, and regards passing events with contempt.

It has kept alive for centuries an army of five million idlers, who, though able-bodied men, produce nothing and live on the charity of those who work.

As to the future of *Sadhuism,* there can be no doubt but that the system is losing somewhat of its hold over the people. The commercial spirit of the West is coming in, emphasizing the desirability of physical good, stimulating the hunt for wealth, and the British government secures this wealth in the possession of the owner.

English education is eagerly sought after, and the youth educated in western thought hold the *Sadhu* in something of disdain. A new national spirit is being developed which substitutes interest in present affairs for a far-off goal of liberation from rebirth.

Consequently the inevitable struggle between the old and the new is already under way, but the spirit of *Sadhuism* is too deeply rooted in the life of India to be altogether displaced.

And, indeed, when one remembers the industrialism of the West, its vulgar aggressiveness, its sordidness, its unscrupulous struggle for wealth, as if that were the only good, the cares of life choking out the good seed and deadening the religious emotions, one cannot but wish that the people of India may long retain enough of this spirit to hold them true to the simple, frugal, unconventional life of the fathers and keep the emphasis on the value of the spiritual and unseen things of life above the material and sensuous.

Photo by W. M. Zumbro

PAYING FOR HIS PARENTS' SINS

In India it is a not uncommon practice for children to fulfill the vows made by their parents and perform their penances for them. Often, as in the case in the picture, a little child is made to lie under a heavy stone—a proceeding which brings great glory to the child, the alms of the bystanders to the parents, and spiritual favors to both.

THE RESULT OF FAITH

It is upon faith in the efficacy of self-inflicted hardship that Hindu asceticism, with its strange and cruel practices and its marvelous legends of superhuman feats, really rests. Unless sustained by an unclouded faith, no man would permit his most useful members to become of no service to him, like the ascetic in the picture.

Photos by W. M. Zumbro

A ROW OF ASCETICS

At every sacred place where pilgrims congregate the *Sadhu* is found in great numbers, and the faithful have abundant opportunities of acquiring merit by bestowing alms on them. Note the deformed hands and arms of the man in the center. They have been held so long in one position that at last it is impossible to move them.

Photo by Wiele and Klein

MAKING DEPOSITS IN THE BANK OF HEAVEN

"'According to Hindu theory, the performance of penances was like making deposits in the bank of heaven. By degrees an enormous credit was accumulated which enables the depositor to draw the amount of his savings without fear of his drafts being refused payment. The power thus gained by weak mortals was so enormous that gods as well as men were equally at the mercy of these all but omnipotent ascetics'" (see text, page 1270).

Photo by Rt. Rev. Bishop of Lucknow

A SADHU HANGING HEAD DOWNWARDS

Sometimes an ascetic will hang in this way for half an hour at a time and at intervals of two hours throughout the day. While suspended, he is swung by a disciple to and fro through the smoke of a log fire beneath him. So great is the admiration excited by a penance of this sort that the offerings for a single day often reach the princely sum of three rupees (one dollar).

Photo by W. M. Zumbro

A "BHOWREEAH"

The term *bhowreeah* is applied to those ascetics who, like the one shown in the picture, wear the hair falling in disorder about the face.

Photo by W. M. Zumbro

THE STOOPING PENANCE

A woman, in fulfillment of a vow, will stoop over, touch the ground with her fingers, straighten up, walk on for the length of her body, and then repeat the operation. This penance—almost exclusively practiced by women—is performed while making the circuit of the rock at Tirupurankundram (see page 1275).

Photo by Raja Deen Dargal and Son

LYING ON THORNS

Thorns have always been considered to possess special virtues in mortifying the flesh. Ascetics in both East and West have found them singularly efficacious. It will be recalled that on one occasion St. Benedict, the founder of Western monasticism, subdued the flesh with the aid of a thorn bush. Note the finger-nails on the left hand of this *Sadhu*.

Photo by V. Arumanayagam

THE IMPORTANCE OF POSTURE

In many systems of *yoga*, which might be called "physical culture of the soul," great importance is attached to certain postures of the hands and feet, the regulation and restraining of the breath, and, above all, the fixed attention of the mind upon the mysteries of the universe. These are considered indisputable means of obtaining a state of pure intelligence, with which comes emancipation and the union of the soul with the Divine. Note the carefully adopted postures of the ascetics in the picture.

Photo by Johnston and Hoffman

HIS LAST LINK WITH THE WORLD

The Hindu ascetic reduces his belongings to a minimum, yet, being human, he occasionally has some pet habit or possession that he cannot induce himself to discard. The kindly old bespectacled *Sadhu* in the picture has renounced the world, but nothing can induce him to give up his tea. Note the cherished kettle in his hand.

Photo by Johnston and Hoffman

LACKING IN ZEAL

In the *Upanishads,* which are numbered among the Hindu Scriptures, it is written: "By ascetic penance goodness is obtained; from goodness understanding is reached; from understanding the self is obtained, and he who has done that does not return" (Mait. Upan. IV, 3). The sturdy beggar shown in the picture does not seem very intent upon the practice of these lofty principles. He toils not, neither does he spin; but he is fed, and not scantily either.

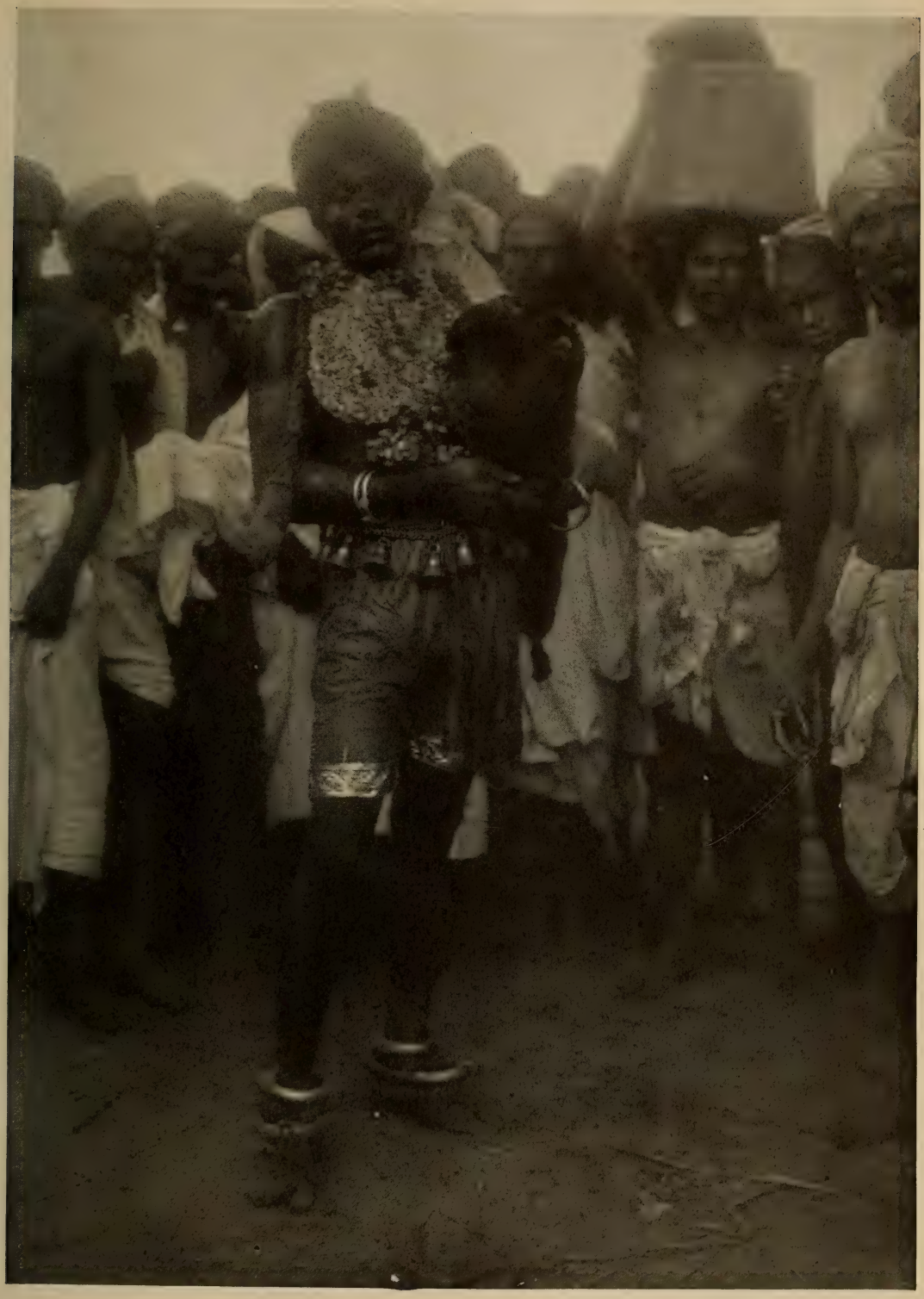


Photo by W. M. Zumbro

AT THE ALAGARCOIL FESTIVAL

Fire plays an important part in the self-tortures that obtain among the ascetics of India. The man in the picture is carrying one of the sacred smoking torches from which fire is obtained at the great Alagarcoil festival.

Photo by Wiele and Klein

FOLLOWING THE PRECEPTS OF MANU

In the Laws of Manu the ascetic life is recommended to the man who has lived the life of a householder and has begotten sons. He must go forth taking nothing with him but the sacred fire and the implements for the domestic sacrifice. When he goes into the forest he may leave his wife, committing her and the house to the care of his sons. Sometimes, but not often, the old woman accompanies her lord, and together, like the couple in the picture, they begin the search for liberation.

Photo from Paul B. Popenoe

A "HOLY" FAMILY

Of the vast army of *Sadhus* who roam about India, either alone or with companions, not many have settled homes. It is unusual to find an ascetic accompanied by a wife and family, for conjugal felicity enjoyed by the *Sadhu* suggests that he has adopted the life merely to prey upon the credulity of the faithful and indulge his own irresponsible indolence.

Photo by Raja Deen Dargal and Son

A GROUP OF SADHUS

One has only to look in the most casual way at an assemblage of *Sadhus* to find that amongst them some have the hair braided and coiled on the top of the head, while others have their matted locks loose and shaggy. Men who wear their hair coiled carefully on the head are, irrespective of sect, called *jhuttadarees*, and those who wear their hair falling in disorder about the face are called *bhowreeahs*.

Photo by W. M. Zumbro

AN ASCETIC WITH ALL HIS BELONGINGS

Extraordinary as it may appear, in the ranks of the ascetics may be found many men of education and culture, both in the eastern and the western sense of the term, who adopt this life in a genuine endeavor to obtain a glimpse at the "hidden side of things." Such men are most often numbered among the *yogis,* who, according to occidental notions, are the least offensive of the ascetics. It must not be imagined that all are of this type, for many of them are actuated by no higher motive than the love of that power and influence which fall to the lot of every holy man in India.

A "HOLY" MAN OF INDIA

Sometimes a man ties his arm to a support so as to keep it erect overhead, until at last the disused limb, reduced to a shrunken and rigid condition, as in this picture, refuses to be lowered again to its natural position. Sometimes the long finger-nails pierce the fingers, causing great pain (see pages 1290 and 1293).

Photo by Wiele and Klein

A CRUEL SELF-TORTURE

At certain seasons of the year many men of the lower castes may be seen to undergo tortures of a cruel kind, as, for example, passing an iron wire through the cheek, as shown in the picture. Sometimes this is done from vanity or a desire for pecuniary gain, but often for less obvious reasons. Note the flower-adorned begging-bowl.

Photo by W. M. Zumbro

SWAMI KARUNANANDA

At the age of 40 this Swami retired from the world and traveled far and wide, covering the whole area between Cape Comorin and the Himalayas, with the sole object of meeting *Sadhus* and sages in the hope of learning at their feet. He became a *viraghya mouni,* or one living the life of speechless silence and the growing of nails—the one indicative of discipleship, mental calmness, and humility, the other of resistance to the temptations of worldly comfort.

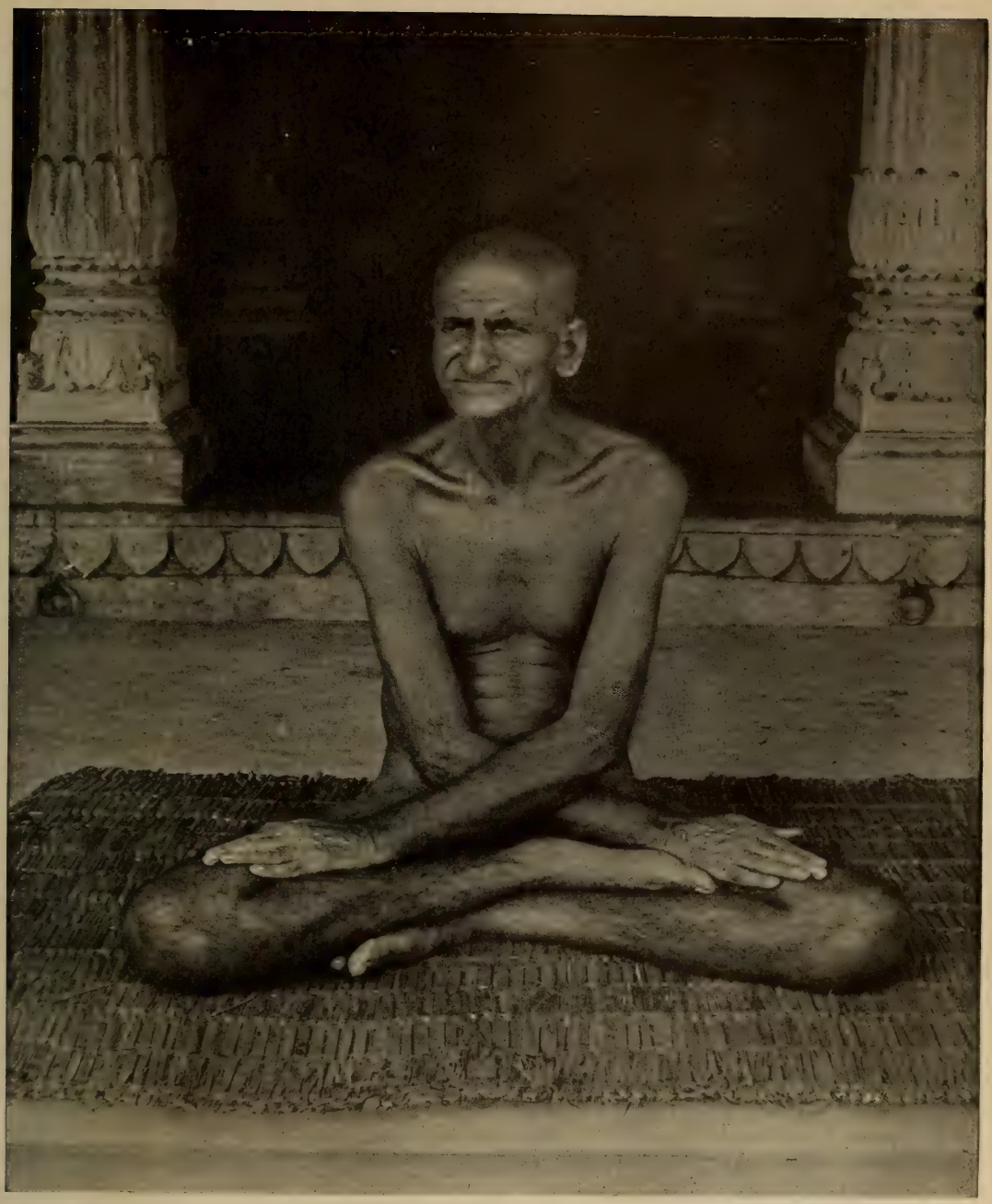


Photo by Mazumdar

A SAGE OF INDIA—SWAMI BHASKARANAND SARASWATI

This Swami was a learned Sanskrit scholar, well known and venerated throughout India. Married at the age of 12, a son was born to him when he was 18, after which he felt that he was freed from any further social obligation, and he decided to renounce the world. At the age of 27 he entered the order of *Sannyasis* (an order of contemplative ascetics), and, according to the custom of the sect which he joined, he discontinued wearing the sacred thread—emblem of his brahmanhood. For 13 years he traveled over India, practicing *tapas* (penance), and then, feeling that he had obtained the ineffable knowledge which he had desired, he settled down for the remainder of his life in the sacred city of Benares. Here he enjoyed the greatest consideration and distinction until his death. Miracles of healing were ascribed to him and temples were built in his honor.

Photo by Wiele and Klein

PREPARING FOR THE POLE SWINGING

This photograph shows the hooks being fastened into the muscles of the back of a devotee preparatory to his being swung in the air, suspended from a high pole. This practice of hook swinging has for some years been forbidden by the British government.

Photo by Wiele and Klein

POLE SWINGING

Here we see the devotee swinging from the high pole, to which he is attached by ropes fastened to an iron hook inserted in the muscles of the back. This devotion was practiced, not by professional holy men, but by ordinary laymen, during periods of intense religious excitement engendered during the exercises at a festival.

THE MAHAMADKHAM FESTIVAL AT KUMBAKONUM

Photo by Dr. W. E. Grubl

Bathing is intimately connected with the religious life of the Hindu; every temple has its tank for ceremonial bathing, ablutions, and lustrations. The sacred waters of the River Ganges, especially at Benares, are popularly supposed to remove the guilt of sin, and therefore attract pilgrims from all over India. The water in the great tank at Kumbakonum, in the Tanjore district of Madras, is popularly supposed to come from the river Ganges, by a subterranean passage 1,200 miles long, once every 12 years. The picture shows the great tank filled with pilgrims waiting for the auspicious moment to bathe.

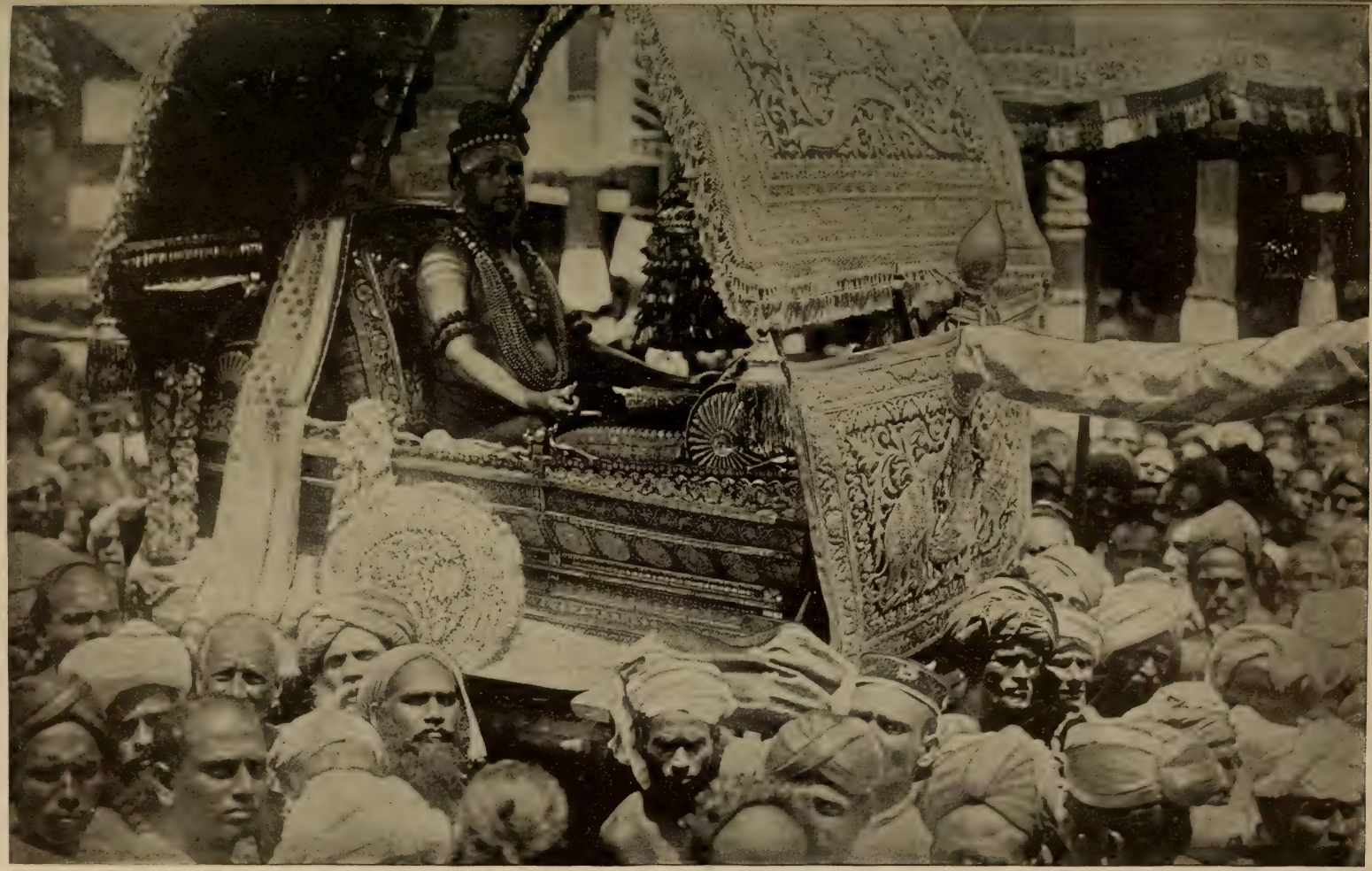


Photo and copyright by Underwood & Underwood

THE HIGH PRIEST OF THE MAHAMADKHAM FESTIVAL AT KUMBAKONUM, INDIA

The high priest of the picturesque bathing festival, held yearly at the city of Kumbakonum, where thousands of Hindu worshipers make a pilgrimage to bathe. He is being carried by devout worshipers in a rich gold and silk embroidered palanquin, to perform the first rites of the sacred bath. After he himself is immersed, the others follow.

Photo by D. S. Herrick

A HINDU SIMON STYLITES

Saint Simon Stylites, the first of the pillar saints, died in the year 459, having spent the last 37 years of his life on a pillar near Antioch. Doubtless the early Christian saints borrowed this devotion from India, where it has been practiced for thousands of years.

THE MARRIAGE OF THE GODS

By John J. Banninga

WHEN the gods get married the people are merry indeed. Then hundreds and thousands throng to Madura from all the villages of South India, for it may be expected that the gods will be in good humor on such an occasion and be willing to bestow the blessings so long withheld.

The marriage ceremonies last for several days and each day has its special functions, but throughout them all the people keep coming until the last and great day of the festival, when Allagar comes from his distant temple to bring his offering to his sister, Meenachi, when certainly not less than 100,000 people are on hand to pay their respects to this popular god.

Siva and Meenachi are the principal personages in the marriage ceremony. Siva, as one of the gods of the Hindu Trinity, is worshiped in all parts of India, but in each part he has joined to himself as wife one of the better known and more dearly beloved goddesses of local fame and popular worship. In South India she is Meenachi, sometimes spoken of as the local substitute for the bloody goddess, Kali, for whom Calcutta is named, but Meenachi is certainly more human and more feminine than the cruel goddess of the North.

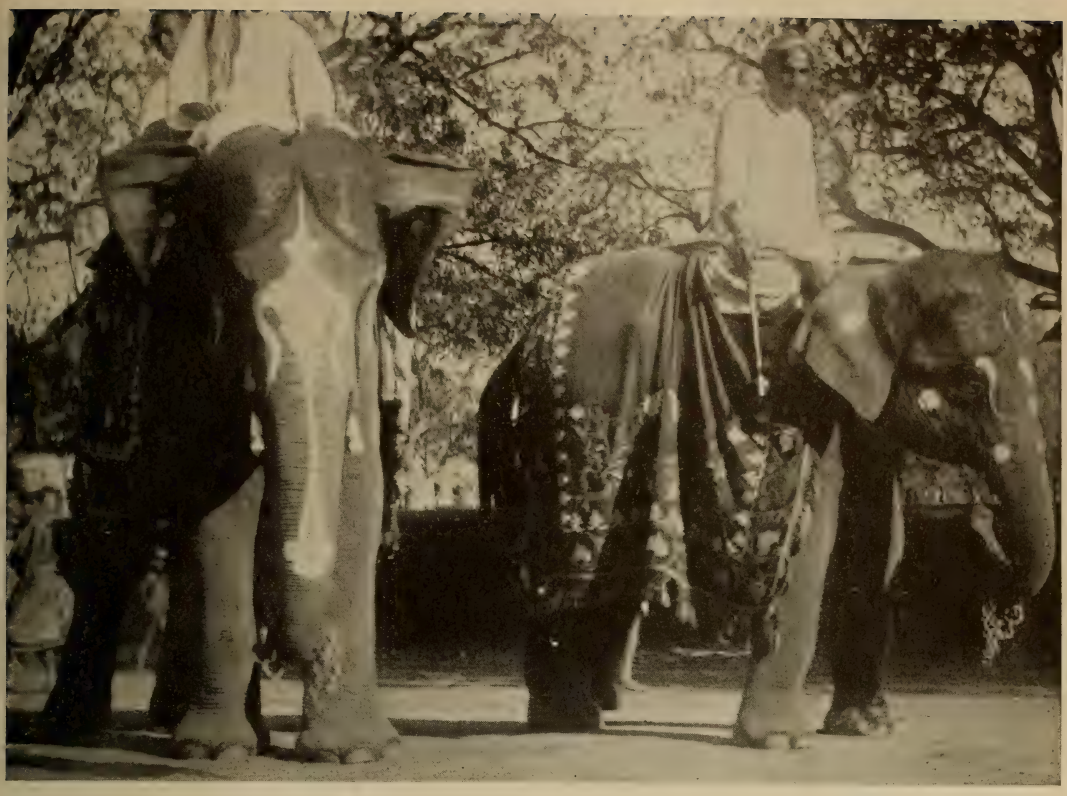


Photo by John J. Banninga

THE TEMPLE ELEPHANTS

On all great occasions in India, whether religious or social, the elephant, in his gay trappings, plays an important part. Here we see the elephants of the great temple at Madura ready to lead the procession at the marriage of the gods.

Day by day the ceremonies lead up to the marriage, which takes place on the full moon day of the month Chitrai, which this year fell on April 20. Visits must be exchanged between the relatives of the bride and groom. Presents must be made and horoscopes examined and found correct. But, finally, all is ready, and with impressive ceremonies Siva is brought from his inner shrine and placed on a pedestal in the marriage hall. Then Meenachi, for whom the great temple in Madura is named, is also brought out and placed beside him. Priests representing the two gods are kept busy anointing them with oil and garlanding them with flowers and in giving presents to each other.

The whole ceremony seems very impressive when judged by the seriousness of those who perform it, but to the Western onlooker it seems to belong to the same age as the map of the universe which is painted on one of the walls of the room. In this the earth is represented in the center of the seven seas that are supposed to surround it—seas of water, air, butter, ghee, honey, etc.

The morning after the marriage all the people take part in the great procession around the town, when the gods are placed in the huge temple cars and taken around the principal streets. The largest of the cars is the gift of the Rajah of Ramnad, a local prince, who is said to have spent some 60,000 rupees ($20,000) on this gift. The car stands not less than 50 feet high when the bamboo and tinsel top is included. The lower part, which forms the platform on which the images rest, must be at least 30 feet high, and is built of deeply carved wood, the figures representing the gods and heroes in various attitudes. The wheels of the

Photo by John J. Banninga

IN GALA ATTIRE

A special feature at the festival of the marriage of the gods is the bands of men and boys, gaily dressed in the brightest of tinsel and colors and garlanded with ropes of flowers. Under their arms they carry skins full of water, which they squirt at intervals in all directions. Note that several bear on their forehead the trident sect mark, which shows them to be worshipers of Vishnu, the preserver (see also page 1273).

Photo by John J. Banninga

A GROUP OF DEVOTEES

Among this group will be found several peasants who will perform acts of penance at the festival. Some of them carry heavy rope whips, with which they will scourge themselves, while others have bundles of rags, which will be set on fire and carried close to the face. Two of the devotees have the sacred peacock's feathers beloved of the god Subramaniam (see also page 1328).

THE BRIDAL PROCESSION OF A GOD

Photo by John J. Banninga

Each year, about the month of April, Madura celebrates the marriage of the god Siva, the destroyer, to a local goddess called Meenachi. On the morning after the wedding the gods are taken on a bridal procession through the streets of the city, so that those who were unable to get into the temple may have an opportunity of sharing in the spiritual blessings of the feast. Here are the temple elephants leading the procession, with the great car of the gods in the background.

Photo by John J. Banninga

PULLING THE BRIDAL CAR

The bridal car is pulled through the streets of Madura by thousands of men. Long ropes of cocoanut fiber, 3 inches thick and 200 feet long, are attached to it and men and boys pull with great enthusiasm. The gods are seated on a pedestal under the center of the canopy, surrounded by dancing girls and priests. The British government has placed the telegraph office of the city on the opposite side of the river, so that the overhead wires would not interfere with the progress of the car through the city streets.

Photo by John J. Banninga

THE DISAPPOINTED GUEST

According to the tradition, Alagar, the brother of the bride, arrives too late for the wedding of the gods. He refuses to join the festivities and goes off to visit a village a few miles from Madura. Here we see Alagar in his car, accompanied by thousands of pilgrims, on his way to the village. The great car is pulled but a short distance, as the god makes the greater part of the journey on a platform carried by twenty men. The tents in the picture contain side shows, for at these festivals the people combine religion and amusement in a curious way.

Photo by John J. Banninga

THE CAR OF THE GODS

The car in which the gods ride during the bridal procession is 50 feet high; the wheels are solid wood, 8 feet in diameter and over a foot thick. The body of the car is of wood, deeply carved with figures of the gods and heroes, elaborately painted and gilded. The superstructure of bamboo is gay with tinsel and gaudy silken hangings. This car was presented by the Raja of Ramnad and is said to have cost 60,000 rupees ($20,000) (see page 1315).

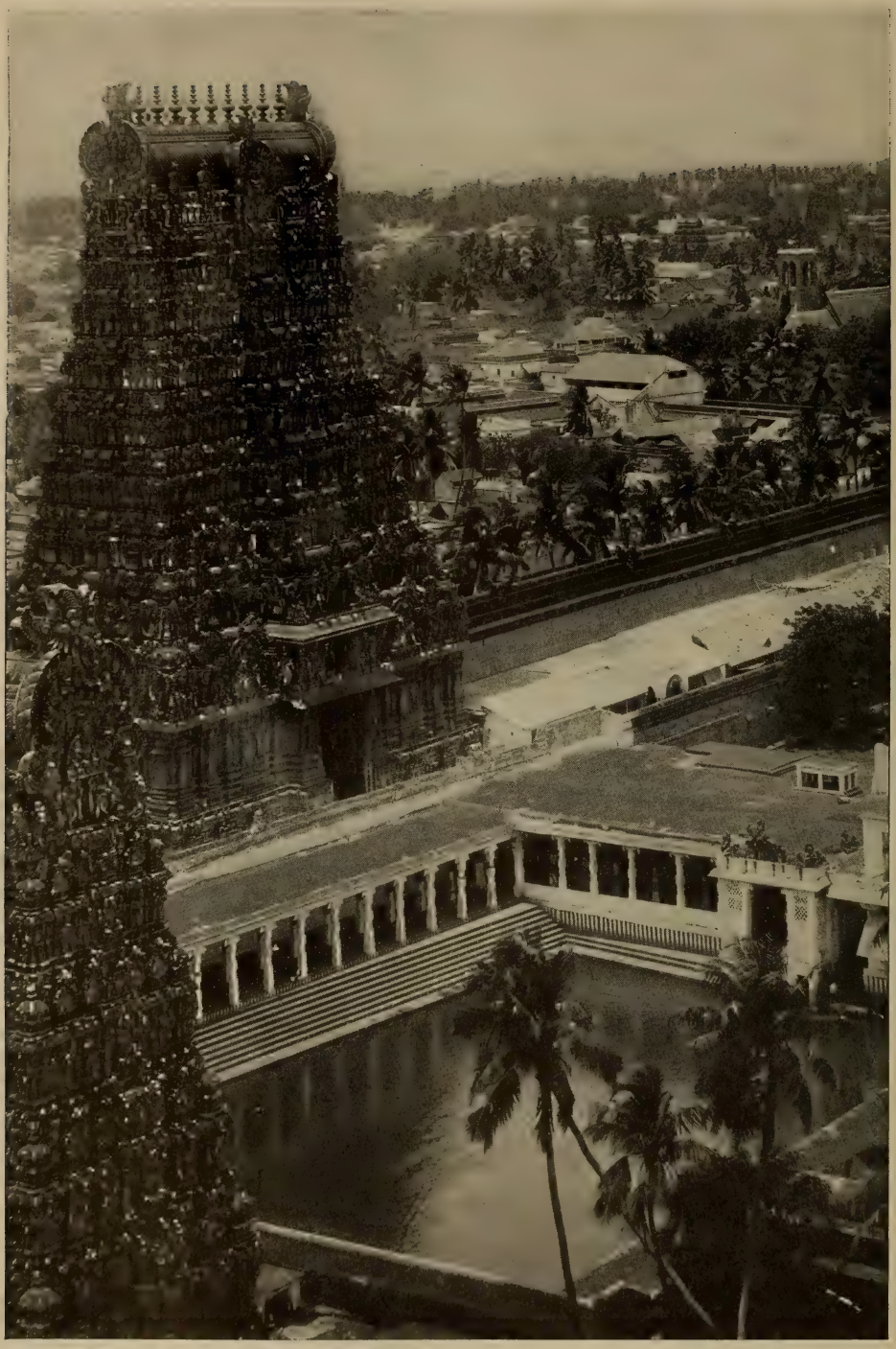


Photo by Dr. W. E. Grubl

THE GOLDEN LILY TANK: MADURA

Here is a view of the Golden Lily Tank in the temple at Madura, with the great gateway, or *gopuram,* rising above it. Beyond are the houses of the city, and close to this great pagan temple can be seen a Christian church.

Photo by John J. Banninga

THE NORTHERN GOPURAM AT MADURA

These ornamental pyramids, or *gopurams,* the gateways into the great temple at Madura, are covered with life-size stucco figures representing all sorts of gods, goddesses, and heroes of Hindu mythology.

Photo by Bourne and Shepherd

THE SOUTHERN GOPURAM AT MADURA

There are nine of these gateways, or *gopurams*, at Madura, the largest of which is 156 feet high. Built over great archways 60 feet in height, these *gopurams* are bewildering masses of color, for each statue is painted, whitewashed, or gilded, and every hue of the rainbow is represented.

Photo by Bourne and Shepherd

DETAIL OF A GOPURAM AT MADURA

This picture shows the bewildering entanglement of symbolism found on these *gopurams*, where many of the gods of the Hindu pantheon find a place. These curious gateways are found only in the south of India and are characteristic of Dravidian architecture, which takes its name from the Dravidians, who belong to the oldest known race inhabiting India.

THE GREAT TEMPLE AT MADURA

Photo by Bourne and Shepherd

This is considered to be the finest example of Dravidian architecture in India. It is a series of enclosed squares, one within the other, the largest of which measures 729 by 847 feet. The actual shrine of the deity to whom it is dedicated is quite insignificant, whilst, proceeding outwards, the gateways, or *gopurams*, are each larger and more elaborately decorated than the preceding. This style of building is effective only at a distance, for a given chapel, hall, or court can never be properly seen until actually entered, for the partition walls prevent the spectator gaining an idea of the temple as a whole.

Photo by John J. Banninga

THE CEREMONIAL BATH

Here we see Brahmin women, members of the highest caste among the Hindus, engaged in the ceremonial bath at the Golden Lily Tank in the temple at Madura. Each temple has its tank where the devotees can perform the bathing ritual that precedes almost every act of the Hindu's religious life.

car are eight feet in height and a foot thick, and are made of solid wood. The axle, also of wood, is a beam more than a foot in diameter.

The cars are pulled by means of long ropes of cocoanut fiber more than three inches thick and a couple hundred feet long. Even when several hundred men pull on these ropes it is impossible to start the car, so large levers, a foot thick and 20 feet long, are used to set it in motion. Then there is a great shout from the people, and they drag it along, sometimes only for a few feet, and then again for a couple hundred yards. There is no steering gear, so wooden wedges are used to put under the wheels. By slipping down the greasy surface of these wedges the car is swung around corners on a large circle.

As the car passes along, men and women bow down and worship the gods. Some pass up their offerings to the priests in the car, while all raise their hands, palms touching, before their faces in deepest reverence until the car has gone beyond them. Many of the poor outcaste people, who are not allowed in the inner precincts of the temple, make use of this occasion to see and worship the gods. Judging from their faces, there is no doubt about their believing that they see the god himself, and that they worship the image as such.

But, by some mistake or other, Allagar, the brother of Meenachi, who was to

Photo by W. M. Zumbro

THE SPIKED-SHOE PENANCE

A very common penance adopted by Indian ascetics is to make journeys, often of many hundred miles in extent, to a sacred place while wearing shoes in which sharp spikes are turned upward so that the sole of the foot rests upon them. The ascetic in the picture is carrying the peacock feathers sacred to the god Subramaniam.

Photo by John J. Banninga

ALMS FOR THE ASCETIC

This is a characteristic picture of Hindu life. The ascetic stands impassive, his begging-bowl in his hands, neither asking for nor refusing the alms of the faithful, while the school-boy acquires merit by contributing to the support of the holy man. This ascetic can be recognized as a devotee of Vishnu by the beads of basil wood he wears (compare page 1282). Note the sandals.

Photo by Bourne and Shepherd

THE PAINTED CORRIDOR IN THE MADURA TEMPLE

A court of many pillars is a feature in every Dravidian temple, and this example is decorated with painting as well as carving. The great temple at Madura, of which this court forms a part, was built between the years 1630 and 1680, the golden age of Indian architecture.

have been one of the chief guests at the marriage, does not get there on the appointed day, and so when he arrives he finds all the ceremonies finished. A representative of Meenachi goes down to the river, which he must cross, to meet him and bring him to the temple.

But when Allagar learns that they have not waited for him he refuses to enter the town, and will not see his sister or send his gift. Thousands of people have gathered in the river bed, which is dry at this time of the year, and they welcome Allagar with great rejoicings. He is one of the popular gods of South India, and has a great hold especially on the Robber caste. They make much of all his peculiarities, and even weaknesses, and it is not too much to say that much evil takes place in the name of religion during this festival.

That the people do not regard religion merely as a piece of asceticism is clearly seen by the devices that are found there for amusing them. The whirligig and the imitation Ferris wheel do a great business. Hawkers sell all kinds of toys, including balloons, whistles, jumping-jacks, etc. And fathers, mothers, boys, and girls buy them freely and seem to enjoy them. The crowd is a gay one, and, though a few are actually busy carrying on the ceremonies around the images, ninety-nine out of a hundred seem busy with their own amusements. The elephants attract much attention. The beggar with his monkey comes in for his share of the good things and the ascetics,

in all manner of positions and with all manner of self-torture, are there to draw the coppers from the knots in the corners of the people's clothes.

When Allagar refuses to go on to the temple of his sister, he decides that he will go to a shrine in a village a couple of miles down the river from which he has received an urgent invitation. All along the way he stops at permanent and temporary shrines and receives the offerings of his devotees. A bullock cart with big chests of brass on it follows him, and people vie with one another in trying to get at the chests to drop in their copper and silver. This trip takes Allagar all day.

He is carried seated on a golden horse, which rests on a platform carried on the shoulders of about twenty men. They rush him from shrine to shrine to the command of the priests in attendance. As he approaches a shrine, the authorities of that place break a bottle of lavender water over the image (for it is the hot season and the god is warm), and he is garlanded with flowers. Presents are given to the priests, and *mantrams* (Scriptural formulas set to a fixed musical chant or rhythm) are recited, and the god is again picked up and rushed to the next shrine. The priest who rides on the platform with the image looks dreadfully bored, but he sticks to his job.

The thousands of brightly clad men and women, the interesting ceremonies, the dry river-bed with its borders of waving cocoanut palms, and over and through it all the sense of a divine presence that all the people seem to feel, even in spite of their hilarity and somewhat questionable conduct—all these bewilder the senses and cloud the mind until one is lost in a maze of thought where East and West stand in opposition.

The practical Westerner sees much he would like to imitate in the child-like faith and simple ceremony. And yet he also sees much that he would like to purify and ennoble. Could the simple faith be linked to a noble ethical code, here would be power indeed.

TEXAS, OUR LARGEST STATE

By N. H. Darton

Geologist of the U. S. Bureau of Mines

Author of "The Southwest," "Our Pacific Northwest," "Bighorn Mountains," and "Mexico, the Treasure House of the World," in the National Geographic Magazine.

ALTHOUGH Texas is larger than France, Germany, or the central Atlantic States, only 15 per cent of its great domain is utilized. Its population is less than that of Ohio or of Massachusetts and Connecticut together, yet all the inhabitants of the United States could be accommodated in the State without its becoming more crowded than New England.

There are opportunities presented in many lines of industry, but the greatest asset of the State are vast areas of arable lands, with mild climate and other conditions favorable for an immense increase in agricultural development. The cities of Texas are not very large, manufacturing is in its infancy, and most of the mineral resources are undeveloped.

Of cotton, the largest single item in her output, Texas supplies one-fifth of the production of the world or one-third of the production of the United States, and still only one-tenth of the area suitable for cotton is under cultivation. Texas has more wheat land than the Dakotas, more corn land than Illinois, more fruit land than California, more timber land than Michigan, and more petroleum than Pennsylvania, but most of these resources are far from being fully utilized.

The great size of the State is very impressive. The transcontinental traveler on the through trains finds that to cross Texas requires time equivalent to all of one night, the next day and night, and part of the following morning. The trip is full of variety. Entering from the

THE HISTORIC ALAMO: SAN ANTONIO

This beautiful old building, built as a mission by the Franciscans in 1719, was held as a fort in 1836 by a gallant little band of Texans, who, after holding off the Mexican army for many days, were finally massacred (see page 1335).

east, for instance, there is a long journey through low lands, with subtropical vegetation and wide fields of cotton and sugar-cane; then comes a gradual ascent into great rolling prairies and a region of semi-arid character, which leads to the high plateaus and lofty ridges of the western part of the State.

The distance from east to west is 740 miles and from north to south 760 miles, or from latitude 26° to 36½° and longitude 93° to 107°. The area is 265,896 square miles, or 7.2 per cent of that of the United States. Diagonal distances across the State are greater: the distance from Point Isabel, south of Brownsville, to Texline, for instance, being 1,107 miles, or more than from Chicago to New York.

Texas extends from the Gulf of Mexico half way across the continent toward the Pacific Ocean, and so far north and south as to comprise a broad belt of the southern part of the temperate zone in one direction and a wide area of semi-tropical region in the other.

To the west it reaches far into the central semi-arid province of the so-called American Desert, and yet has within its eastern confines a broad strip of the Gulf coast plain and Mississippi embayment. The Rio Grande is its southwestern boundary for nearly 800 miles, and the Gulf of Mexico has 400 miles of its shoreline in Texas.

FOR NINE YEARS TEXAS WAS AN INDEPENDENT REPUBLIC

No State has had a more remarkable history than Texas, though many of the most notable events were in the distant past. The flags of three foreign powers—France, Spain, and Mexico—have floated over her, and for nine years she was an independent republic, with ministers to foreign courts as well as to Washington.

The first Europeans to visit Texas

IN THE PLAZA OF THE ALAMO: SAN ANTONIO

The plaza of the Alamo, one of the many beauty spots in the city of San Antonio, is a handsome park containing a wealth of subtropical vegetation. Note the flowering aloe

LOADING MULES ON A FERRY NEAR BROWNSVILLE

The production of mules is an important industry in Texas, and, in spite of the large supply, there is an ever-growing demand. Good mules bring nearly double the price of horses in the local markets.

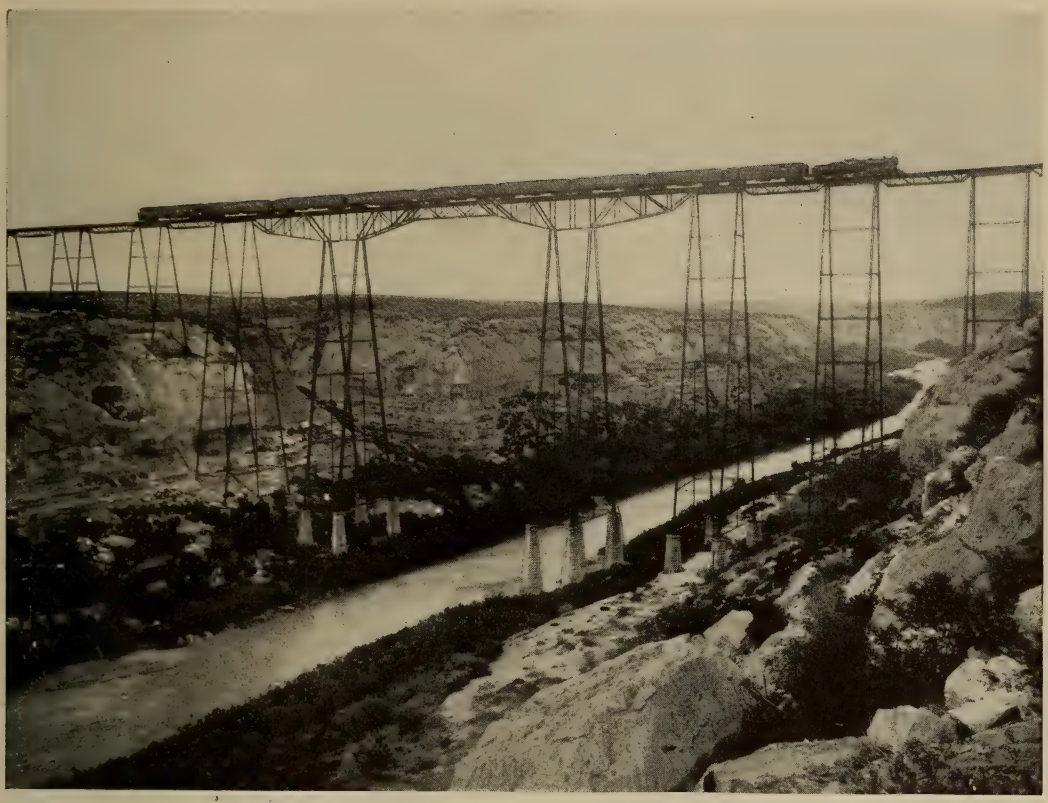
were the Spaniards, who sailed along the Gulf coast in 1519; they also made interior explorations as early as 1535, but without effort to colonize. Chevalier La Salle reached the shore of Texas on New Year's day, 1685, and sailed into Matagorda Bay believing it was one of the mouths of the Mississippi, which he had discovered three years before. There is now at Port Lavaca an iron cross which is believed to be the identical one with which La Salle took possession in the name of the King of France. The colony he established was short lived after the assassination of its leader. If it had survived it would doubtless have been destroyed by a Spanish expedition which was sent against it.

In 1689 or 1690 the Spanish established a mission settlement at San Antonio, but were forced to abandon it in 1694 because of the hostility of the Indians. Fearing an incursion of the French from Louisiana, a fort was established at San Antonio in 1718 by de Larcon, Spanish Governor of the Mexican State of Coahuila. At this time was built the mission of San Antonio de Valero, later known as the Alamo.

This was the beginning of the San Antonio settlement, which was chartered by Ferdinand Third of Spain in 1731, with the name San Fernando, but later was known as Bexar and finally San Antonio. The early settlers of the place were immigrants from the Canary Islands. For more than a century San Antonio was the headquarters for most Texas interests, so that it was the scene of many of the struggles of the old days—fights

WATCHING THE MEXICAN BORDER

The United States troops in Texas have a busy time these days patrolling the Mexican border. Here we see cavalry, artillery, and heavy supply wagons crossing a river on a rapidly constructed pontoon bridge which the soldiers themselves have made



THE GREAT PECOS VIADUCT

This great viaduct, which is 321 feet high and nearly half a mile in length, carries the tracks of the Southern Pacific Railroad over the Pecos River, a short distance above its mouth.

with the Indians, Franco-Spanish contentions, border outlawry, the Mexican-Spanish war, and the final break for independence from Mexican dominion.

THE STAND AT THE ALAMO

It was in 1817 that the Texans, then mostly Americans, joined with the Mexicans, and with a force of only 800 men defeated the 2,500 Spanish troops near San Antonio—a victory which led, in 1824, to the final separation from Spain, when Texas became a part of the Republic of Mexico.

Most of the struggle for the independence of Texas took place about San Antonio, culminating in March, 1836, in the famous stand at the Alamo by a little garrison of 188 men under Colonel Travis. This was besieged by 2,000 Mexicans and not taken until after a hard fight of 11 days, in which all the Texans were finally killed.

The struggle at the Alamo was one of the heroic episodes of the world and it roused the patriotism of the Texans to a high pitch. Gen. Sam Houston had expected to relieve the little garrison, but on hearing of its fall he concentrated his forces in other directions and, adding many recruits, prepared for a final contest. This occurred a few weeks later, when in one swift charge his little army of 783 gained a victory over Santa Ana's Mexican force, twice as many in number, and Texas was free. In this furious battle, which lasted only 15 minutes, the Mexicans lost 630 killed, 208 wounded, and 230 prisoners, while the Texans lost only 8 killed and 25 wounded.

The battlefield was at San Jacinto, near Houston, and the place is now reserved as a State park.

After enjoying her independence as a republic for nine years, Texas joined the

THE PARENT OF A NEW INDUSTRY

Here is an imported Angora goat of high pedigree, valued at $500. Goat-raising is a new and growing industry in the Southwest, and from these flocks of Angora goats comes the valuable mohair of commerce.

Union in 1845. She has always had her individuality; she was not segregated out of the great area of public lands of the West, nor the product of any foreign treaty or concession. Some of her extension to the north was sold later to the United States and now constitutes the eastern half of New Mexico.

The question of dividing the great area of Texas into two States is often discussed, for the settlers of western Texas sometimes claim that their interests are so different from those of the eastern half of the State that they do not get fair representation in legislature or Congress. It was, however, provided in the transfer into the Union that there should be no division without the consent of her people, and as public opinion is highly adverse to any such proposition it is very unlikely that consent will ever be given.

THE NATURAL DIVISIONS OF THE STATE

There is a great diversity of physical features in Texas, ranging from the semi-tropical lowlands to the high arid plateaus of the interior. This diversity is caused by the variety of geologic and climatic conditions, such as would naturally be expected in so large an area.

The Gulf Coast region, underlain by younger rocks, is uplifted but little above sea-level. It is mostly so far south that it presents many features of a subtropical province, especially in its central and eastern part, where the rainfall is fairly high. This region extends from along the Gulf for about 400 miles, from Sabine River to the Rio Grande, and is from 50 to 100 miles wide.

Though it is low, much of it is well drained and only a small proportion of it is under cultivation.

A RUINED MISSION

This old mission of San José, a few miles south of San Antonio, is considered one of the finest examples of mission architecture in America

Eastern Texas is a country of diversified topography, varying in altitude from 50 to 700 feet, with wide areas of overflow lands extensively utilized for rice culture, and with a vast interior forest of long-leaf pine. The great "black land" belt, famous for its fertility, is in this district.

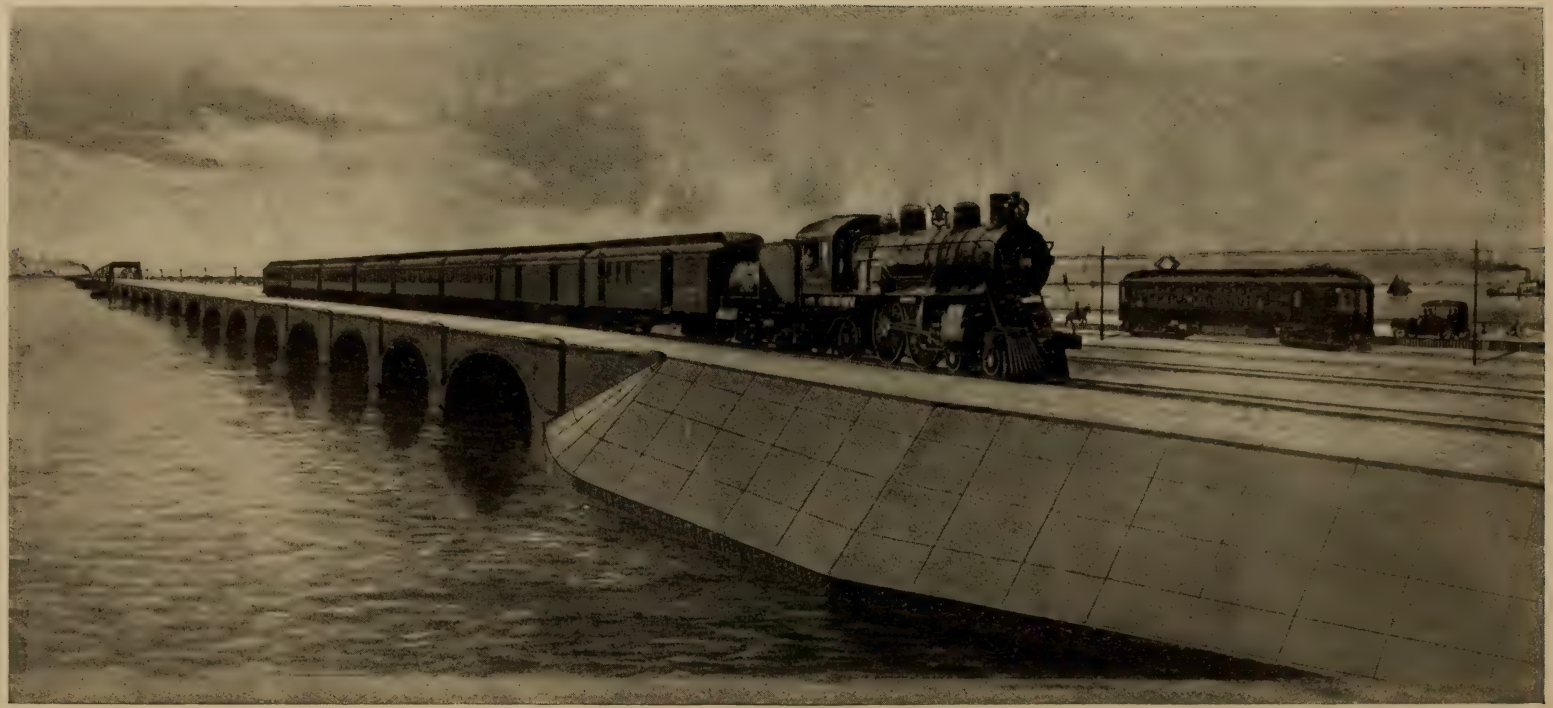
Central Texas is a region of dissected plateaus and rolling hilly lands, much of it lying between altitudes of 1,000 to 2,000 feet above sea-level. General farming and stock raising are its principal industries, with extensive cotton fields in the lower lands of its southern part. It has large areas of fertile soil and a climate approaching that of the temperate zone.

Northwestern Texas is the great "Panhandle" district, lying mostly on the high plateau of the Staked Plains, with altitudes from 3,000 to 4,000 feet. It also includes the lower slopes of this province to the eastward, with altitudes of 1,800 to 2,500 feet. It is divided into 44 counties, with a total area of about 44,000 square miles, or nearly equal to that of Pennsylvania. For a long time it was a thinly settled stock country, but in recent years its settlement has been advancing rapidly. The climate is cool and semi-arid, with rainfall of 15 to 25 inches; but the soil is fertile, and dry land crops yield good returns (see maps, pp. 1353, 1355).

It is drained by two great rivers—the Canadian and the Red—the latter rising on the high plateau within the State bounds. At the eastern edge of the plateau there are steep declivities, amounting to a thousand feet or more, descending to the rolling prairies which stretch far to the eastward.

The western end of Texas is a very different country from other portions of the State. It is a region of wide desert valleys and many ridges, mountains, and plateau remnants of various kinds. The altitudes range from 2,000 feet in the valleys to more than 9,000 feet in the higher mountain peaks.

It is traversed by two great rivers, the Rio Grande and the Pecos, but for a large part of their courses these streams are in rocky canyons. The climate is arid, with rainfall less than 10 inches about El Paso and 15 inches farther east. Cattle rais-



THE GREAT CAUSEWAY AT GALVESTON

This great causeway, which connects the island of Galveston with the mainland, is a triumph of concrete construction. It accommodates four railroad tracks, an interurban car track, and a spacious roadway for vehicles and pedestrians. It is slightly more than two miles long and 154 feet wide, except at a lift-bridge section, where its width is 66 feet. The cost of the causeway was $1,500.000 (see page 1355).

SHIPPING COTTON AT GALVESTON

In the value of its exports Galveston ranks as a port second only to New York, and it ships more cotton than any port in the world. The value of this export alone is over $200,000,000 per annum. Among the other shipments of great value are cotton-seed products, wheat, corn, lumber, and flour (see page 1355).

BATHING IN MIDWINTER

On the coast of Texas the climate is so mild that ocean bathing continues all through the winter, while the surf of the Gulf of Mexico is quite equal to that produced by the long rollers of the Atlantic

IN THE CITY OF OLEANDERS

The residential section of Galveston is reputed to be one of the most picturesque in the United States. There are miles of beautiful streets, with handsome residences set in gardens aglow with flowers and semi-tropical plants (see page 1357)

WILD CRANES NEAR BROWNSVILLE

In the lagoons and inlets of the Texan coast, especially near the Mexican border, many rare tropical birds are found, including the snowy heron, one of the most beautiful of our plume birds, the crane, and the pelican

ing is the principal industry, but irrigation is successful in many of the valleys and numerous settlements are developing gradually.

A LAND OF GENIAL WARMTH

An area so large as Texas naturally has considerable variety of climate. It ranges from semi-tropical in the far south to that of the southern part of the temperate zone in the semi-arid regions of the mountains and high plains in the western and northwestern part of the State. In the eastern section north of the Gulf there is a district of considerable extent with notably high rainfall, exceeding 55 inches a year.

Excepting in the highest lands, the winters are mild, save for the keen breath of an occasional "norther," and near the coast the heat of midsummer is pleasantly tempered by breezes from the Gulf. Snow rarely extends south of Austin.

On the whole, the claim that Texas has an ideal climate is fairly well justified. Some midsummer days in the far south are rather trying, and in every winter short spells of cold weather reach far across the State and linger awhile on the high plains of the Panhandle. Some official figures from representative stations in the larger divisions of the State are as follows (see also map, page 1355):

Stations.	Elevation, feet.	Temperatures			Precipitation, inches.
		Jan.	July.	Mean annual	
Brownsville	30	60.8	83.0	72 7	26.9
Galveston	40	52.7	83.0	69.4	46.3
San Antonio	650	51.1	82.4	67.9	28.0
Fort Worth	700	46.1	82 5	64.8	33.3
Amarillo	3,654	36.6	75.3	55.9	21.9
El Paso	3,370	44.1	80.5	62.9	9.2

Brownsville is in the extreme southern extremity of Texas, very nearly as far south as the southern termination of Florida. This accounts for the high mean annual temperature and the small difference between January and July averages. It is, however, so far west as to be out of the zone of heavy rainfall. Galveston, farther north up the coast, has more typical Gulf Coast climate, with mild winters and summer heat greatly moderated by nearly continuous Gulf breezes. San Antonio, in the central part of southern Texas, is representative of a wide area of the inland country. Fort Worth is in the central part of north Texas, Amarillo is on the high plateau of the Staked Plains in the "Panhandle," and El Paso is at the western end of the State, in the great interior arid belt.

HOW THE POPULATION IS GROWING

The present population of Texas is a little over 4,000,000, which is close to 15 persons to the square mile. This number is not great, considering the size of Texas; for if all the people in this country were moved into the State, the population would be less crowded than it is in Massachusetts, a State which now has a materially smaller population than Texas. The increase has been gradual, passing the million mark in 1872, 2,000,000 in 1886 or 1887, and 3,000,000 in 1900. The rate of increase of population of Texas in the decade 1900 to 1910 was materially greater than that of the United States and of all States having greater population than 3,000,000.

About 71 per cent of the population are native white Americans; 98 per cent of the population speak English; the remaining 2 per cent are Spanish speaking, being largely Mexicans. There are 19 per cent of negroes in the population, but the percentage of white is slowly gaining on this by means of a greater net increase.

There are 107,110 more males than females, according to last census. The death-rate is 11 per 1,000 a year, and, as the births average 343 a day, their ratio to deaths is nearly three to one.

Immigration is about equal to the net increase by births. Many of the immigrants are from other portions of the United States, and a fair proportion of them bring funds to invest in farms. It is estimated that $700,000 a day comes to Texas in investments in farms, factories, railroads, and other industries.

THE SOURCE OF ONE-FIFTH OF THE WORLD'S COTTON

Texas is preëminently an agricultural State, for nearly all of its area is arable, the soils are rich, and the mild climate

UP-TO-DATE FARMING

Here is a typical piece of Texas prairie land, where the rich, black soil stretches in an unbroken level for miles in every direction. Many of the ranchers have introduced the latest machinery for working their land on a large scale with a great saving of time and labor and a proportionate increase of profit.

AN ARTESIAN WELL

Wide areas in Texas are underlain by water-bearing strata, from which an inexhaustible supply of pure water can be obtained at little expense by boring a well of no great depth. Such wells are an important source of supply both for drinking and irrigation.

favorable. Some portions are semi-arid, but parts of these can be reclaimed by irrigation or will grow certain suitable crops. Of its 167,924,720 acres, only one-seventh is under cultivation, but this yields farm products valued at $561,339,000 a year. The farms are large, 360 acres being the average as against 146 acres as the average in all the United States.

Much of the farming is not of a very high standard, for the average value of products per acre is only $1.43, while Illinois farms, for example, average $9.54 an acre, and they are by no means up to the highest plane of productivity. Considering the advantageous climatic capabilities, the greater part of the farm products are few in number and, omitting cotton, rice, and sugar, which grow in a relatively small area, most of the crops are articles of low value. This is not stated disparagingly, but to show that when there is more diversified farming and the higher-priced crops are produced, Texas will make a wonderful showing.

The immigration into the State averages 100,000 a year, mainly for the purpose of farming. Those who come are mostly Americans, with more or less capital. It is claimed that about 50 per cent of the farmers own their farms and 37 per cent of the families, urban and rural, own their homes.

Cotton, the greatest single item in the world's agricultural production, is the principal crop in Texas. The 1911-1912 output from the United States was over 16 million bales of 500 pounds each, valued at about a billion dollars, and about one-fifth of this was raised in Texas. The 1912-1913 output was 13,703,421 bales, of which Texas produced 4,880,210 bales, or more than one-third of the total crop. Most of the cotton grows on the wide bottom lands bordering the rivers of the coast country, with

CAULIFLOWERS BY THE MILE

Here is a scene on one of the great truck farms near Brownsville, in southern Texas. On this farm was produced a cauliflower that succeeded in winning a record number of prizes for its fortunate grower. Note the luxuriant growth of the leaves and the size that they attain

an aggregate area of 10,088,000 acres. It is claimed that not more than one-tenth of the land suitable for cotton is under cultivation, and on the basis of one-third of a bale to the acre this would indicate a possible production of 40 million bales a year, or more than double the present crop of the world.

While the acreage return in the United States is about three-eighths per bale to the acre and the plants ordinarily are about 3 feet high, there are many places in Texas where cotton yields two bales to the acre and the plants are 10 to 12 feet high. This is without the use of fertilizer. Production of one bale to the acre is frequent over wide areas, and with cotton at $50 to $60 a bale this is a profitable yield.

Texas ships most of her cotton to foreign ports, using only one bale in 70 in her own mills. The number of mills is increasing, shipping facilities are being bettered, and the cotton seed is being utilized to better advantage, so that the cotton industry is gaining in various ways.

No one who sees much of the cotton industry can fail to be impressed by the great waste in handling it. The bales are poorly wrapped and bound, and the sampling process of cutting a great gash in the center of the bale is needlessly crude and wasteful. Nearly every foreign market complains of the bad condition in which our cotton is received.

THE PASSING OF THE OLD CATTLE RANGES

From an early date Texas has been famous for her cattle and many persons still have the idea that the entire State is a great cattle range. The latest statistics show nearly 8,000,000 head of cattle, many more than in any other State.

While some large ranges remain, notably the King Ranch of 1,000,000 acres, numerous ranching districts have been cut up into farms and in general the cattle business is diminishing. The notorious "long-horn" steer is nearly extinct, his place having been taken by the much higher grade, white-faced Herefords and other heavy cattle. These are much more profitable to sell and cost but little more to raise, after the herd is started.

Texas is credited with over 1,000,000 milk cows, 2,071,000 horses and mules, over 2,000,000 sheep, and 3,205,000 hogs, all of which, with the range steers, have a value estimated at $312,857,000.

The scrubby Texas pony is also being displaced or bred up to higher class. Now the average Texas horse is valued at $71, and while this is not up to the standard of Illinois, for instance, where the average horse value is $109, it is far higher than it was a few years ago.

A GREAT LUMBER REGION

Texas is one of our largest producers of pine lumber and the eastern and northeastern counties contain extensive forests of fine timber. There is also a liberal supply of hardwoods, which are being freely cut. The forest conditions are very diverse, comprising the swamp and bayou growths and the wide territory of long-leaf pine to the east, the broad region of post oak to the north, and the bull pine and red fir scattered over the summits and peaks of the far west.

The stand of pine in Texas is estimated from 27 to 40 billions of feet, and of hardwood about 10 billions more. The manufacture of pine lumber was about 2 billion feet in the past year, with a selling value of about 45 million dollars.

MORE VALUABLE THAN GOLD

Texas has no great gold mines, but there are many mineral resources of far greater value. Petroleum has been produced in such large amounts that the State now stands fourth among the producers, with an output of nearly 13 million barrels a year, valued at about $7,000,000. This oil is not only in great demand for shipment, but it is a valuable fuel for local use, 3½ barrels of it being equal to a ton of coal, and only costing from $3 to $3.25.

There are in Texas more than 1,000 miles of 6 to 8 inch pipe-lines to carry the oil of Texas and Oklahoma, with capacity of 50,000 barrels a day, and more than $10,000,000 are invested in pipelines, pumps, and tanks. Eight large refineries, with capacity of 35,000 barrels a day, utilize a part of the output.

Natural gas is also produced by some

ONCE DESPISED, NOW USEFUL

At one time the spiney cactus of the desert was considered an absolutely useless product; today it is cultivated with the greatest care. There are miles upon miles of Texas under cactus, for it has proved to be one of the most useful forage plants of the Southwest. A light application of a torch burns off the spines and it is then an excellent cattle food.

of the wells and furnishes cheap fuel for many important industries.

Coal underlies a very large area in the State and in many places is mined cheaply.

It has been estimated by the United States Geological Survey that the known areas of bituminous coal cover 8,200 square miles, and that 5,300 square miles less well known contain more or less workable coal. The known lignite areas cover 2,000 square miles, and there is more or less valuable lignite under 53,000 square miles. The total tonnage is estimated at 31 billion tons, of which less than one-tenth of one per cent has already been mined.

There are great deposits of iron ores, salt, building stone, asphalt, clays, gypsum, and other valuable minerals in Texas, most of them not yet extensively developed.

Water, the most important and valuable of all minerals, occurs in numerous streams and springs and in vast supplies underground and is tapped by artesian and other wells. The artesian waters are utilized in many districts both for domestic and municipal use and for irrigation.

Texas is drawing more water from the ground by artesian wells than any other State in the Union, not excepting South Dakota, and this water is one of the essential elements in the development of wide areas, in which surface supplies are insufficient or unsatisfactory in quality. Houston, for example, has 42 wells 300 to 1,400 feet deep, yielding 28,000,000 gallons a day, which is sold at 30 cents per 1,000 gallons.

PUBLIC LANDS

When Texas was taken into the United States, in 1846, she reserved her public domain as State property, a unique condition which no other State enjoyed. Four years later she sold to the Federal government for $10,000,000 the portion now constituting the eastern half of New Mexico. The State has a public land policy of its own materially different from that of other commonwealths, the main feature being that it grants larger areas to the settler. As a republic, Texas had but little cash, no credit, and no established taxation, so it had to dispose of land for money or its equivalent. To this end there were large issues of land script and large grants of land were also made to old settlers, immigrants, and soldiers, amounting in all to nearly 40 million acres. Land was also offered as recompense to agents bringing in colonists and to railroads, while about 52 million acres have been set apart for educational purposes.

THE BUSY CITIES OF TEXAS

Texas has nine cities with population exceeding 20,000 and 40 cities with more than 5,000 population. San Antonio leads in size, for she has attained the 100,000 mark, including the United States troops in near-by Fort Sam Houston.

This city is located in the center of the southern portion of the State and is the metropolis of a wide area in one of the most prosperous sections of Texas. San Antonio was started by a few Franciscan friars 200 years ago and has been the center of many stirring episodes of Texan history. It is built about the historic Alamo, and while this famous building and other notable old missions remain, San Antonio is very modern in temperament, as well as in development. Her jobbing and retail trade amount to $37,000,000 a year and manufactures to $17,000,000, which is a remarkable showing for a town of its size.

A few of the old-time features still remain in striking contrast to the new skyscrapers and other products of modern progress. Here and there may still be seen old Mexican homes, with heavy cedar doors hung on primitive home-made hinges, that were built in the early days. San Antonio is a favorite resort for tourists, of whom it entertains 25,000 to 30,000 every season. It is well equipped with modern hotels, has a delightful winter climate, and there are many "sights" to entertain the visitor. The old Alamo, in the heart of the town, is the center of interest, and especially the Mecca, of all patriotic Texans. It was here that the heroic little band of Texan soldiers, fighting for independence, held off the Mexi-

GATHERING STRAWBERRIES IN FEBRUARY

The production of early fruit and vegetables for the Northern market is becoming every year a more and more important industry in the Galveston-Houston district of Texas. There are few regions in the United States where both soil and climate are so favorable to this sort of truck farming.

A FIELD OF ALFALFA

Alfalfa, the great forage crop of the West, grows luxuriant in Texas, and even in the arid regions near El Paso fine harvests are gathered from the irrigated lands. In all the warmer parts of the State no less than three harvests a year are obtained

A WHEAT FIELD IN WESTERN TEXAS

Texas possesses some of the finest wheat land in the United States, notably along the banks of the Rio Grande in the vicinity of El Paso. Some idea of the excellent crops grown here can be formed by comparing the height of the growing wheat with that of the man on horseback

OUTLINE MAP OF TEXAS

can army for eleven days, until all the defenders were killed (see page 1335).

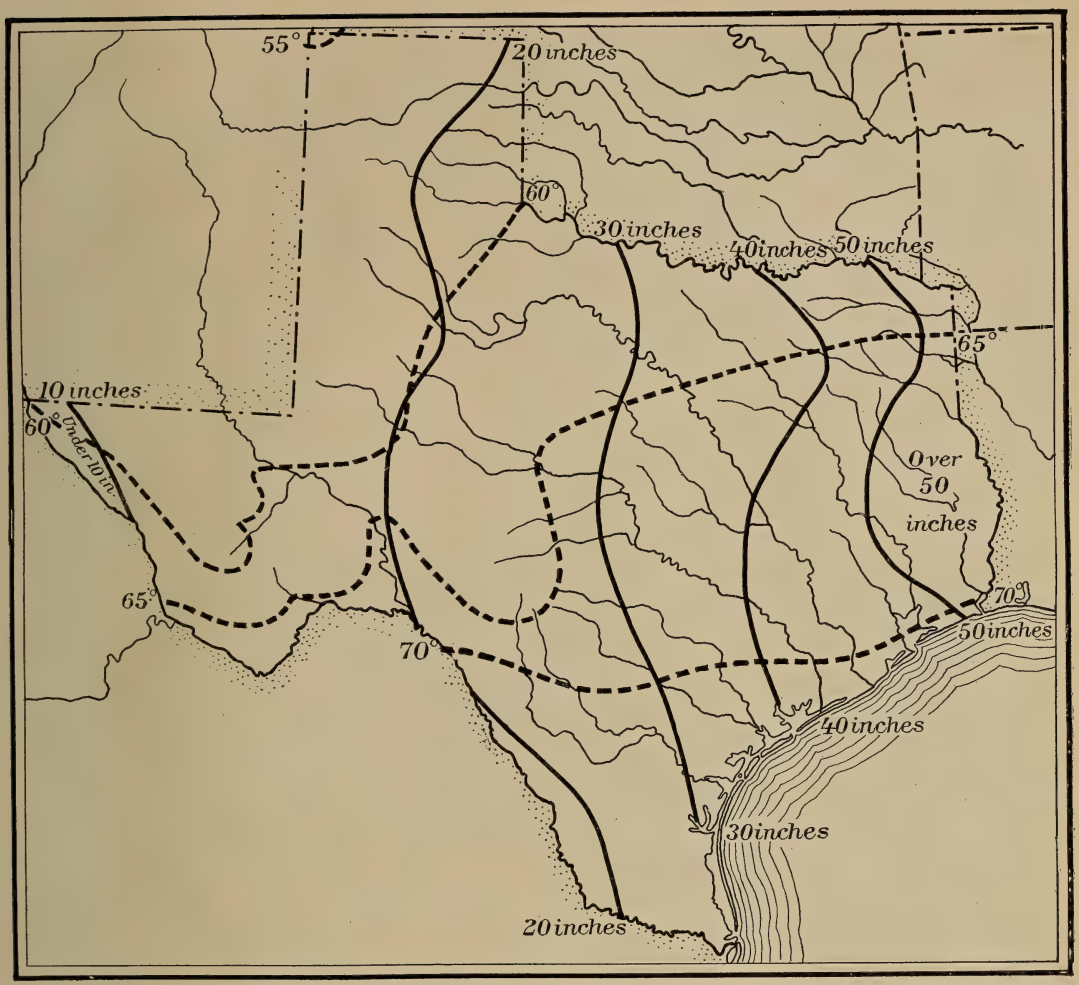
The old missions near the city are San José, four miles south, founded in 1720, a year later than the Alamo; San Juan and San Espada, still further south, both founded in 1731, and Conception de la Acuna, two miles south, also founded in 1731. The Cathedral of San Fernando, in the center of the Mexican quarter of the city, dates from 1734 and is still in use. Other points of interest are the old stone blockhouse at San Pedro Springs, the Spanish Governors' palace on Military Plaza, and the entirely modern Fort Sam Houston, costing $3,800,000, which is the second largest military post in the United States.

Dallas is a close second to San Antonio in population, and, having a somewhat more rapid rate of increase, she is likely to outstrip the older town. Her population now is close to 100,000, and her large manufacturing interests and prosperous surrounding country are strong factors of her prosperity.

Dallas is located in the north-central part of the State, only 30 miles east of the large city of Fort Worth, so that the metropolitan interests of that part of the State are somewhat divided. Within a 100-mile radius of Dallas reside one-third

THE SUCCESSORS OF THE "LONG-HORN"

The old "long-horn" cattle of Texas, so famous when the cowboy was at the height of his glory more than twenty years ago, have now given place to carefully bred cattle of good pedigree stock. With the high-grade cattle breeders the heavy beef-making, white-faced Herefords shown in the picture are prime favorites (see page 1347).



OUTLINE MAP OF TEXAS SHOWING ANNUAL RAINFALL AND MEAN ANNUAL TEMPERATURE ZONES (SEE PAGE 1343)

of the population of Texas, and from that region comes one-twelfth of the cotton crop of the United States, besides large crops of corn and grain. Some 300 factories represent an investment of about $27,000,000 and pay $4,435,000 a year to employees.

Fort Worth has about 75,000 population, but as this is nearly three times as much as it had 10 years ago there are great expectations for the future. Fort Worth leads in stock and grain interests and now has 18 elevators, with a capacity of 2,555,000 bushels of grain.

Houston has nearly 100,000 inhabitants, the number having more than doubled since 1900. It is the hub of southeastern Texas, with 17 railroads and the most extensive terminals south of St. Louis. Here is the largest cotton market in the world, handling over 2,500,000 bales a year—that is, over 20 per cent of the crop of the United States—and 65 per cent that of Texas alone, with money value exceeding $120,000,000. The cotton-seed oil production alone is a large item.

Houston's wholesale trade in other lines is $125,000,000 and retail trade $52,000,000 a year. It is a headquarters of a large trade in long-leaf pine lumber, an industry in which it has invested more than $50,000,000. It is the principal rice market, handling 2,600,000 bags a year or two-thirds of the Texas production. It also does a large sugar and molasses

A TEXAN STREAM

Many of the sluggish streams of the coastal plain are bordered by dense forests and the trees are often heavily burdened with hanging Spanish moss, which produces an effect of great beauty and grace.

business; the items of syrup and molasses amount to over 10 million gallons a year.

Although 45 miles from the Gulf, Houston has an outlet to the sea which is of greatest importance to her commerce. It is now from 9 to 18 feet deep, with a large turning basin at its head, and more than $45,210,430 worth of freight passed through it last year. With liberal aid from Congress, this channel is now being deepened to 25 feet.

The importance of deep waterways to permit transoceanic shipment by large vessels is well illustrated by some figures obtained on the Atlantic coast. It was found that with a 22-foot channel the cost per bushel of grain from Houston to Liverpool was 23 cents; with a 25-foot channel, 16 cents; with a 30-foot channel, 10 cents, and with a 35-foot channel, 3 cents, which is now the ordinary rate from New York to Liverpool.

THE DOOR TO MEXICO

It is a long journey from Houston to El Paso, with many changes of scene from the semi-tropical coast region to the high arid interior lying nearly 4,000 feet above sea-level. El Paso is in many ways an isolated city, for it is 1,500 miles east or west and nearly the same distance north or south to a city of like size. Therefore, although in a thinly populated region, it is a most important business center, and has grown until now it has a population of over 50,000, much of it in recent years, for the rate of increase from 1900 to 1910 was 146 per cent.

Her five railroad lines, one of them the transcontinental Southern Pacific, have here an annual business of 15 million tons of freight and a yearly pay-roll of $3,000,000. Situated as it is on our southern frontier, El Paso handles a large proportion of our Mexican trade.

This proximity to Mexico has occasioned many excitements in the city during the revolutionary uprisings, for Ciudad Juarez, her little neighbor across the Rio Grande, has received an undue share of troubles during the various recent conflicts.

Although in an arid region, with less than 10 inches of rainfall, El Paso is an agricultural center of importance for products of irrigation. The waters of the Rio Grande are utilized, and when the great Elephant Butte dam is completed, 100 miles up the river, it will greatly add to the water resources available about El Paso.

A STORY OF MARVELOUS ACHIEVEMENT

Today Galveston stands second only to New York as an export port. It is expected that when the Panama Canal is completed its volume of business will be greatly increased, for the distance to Colon is only 1,496 miles, or 467 miles less than from New York. Galveston is the natural gateway to the ocean for a great part of our southern middle west. Seven railroad systems bring cotton, grain, and other products, which are handled by 33 ocean steamship companies, six coastwise lines, and many individual vessels. Cotton is the largest export item, valued at close to $200,000,000.

The city is built on a sandy island of 13 square miles in extent rising only a few feet above the Gulf. For this reason it was inundated during the great storm of September 8, 1900, when some 6,000 inhabitants lost their lives and 20 million dollars' worth of property was destroyed. Soon after this appalling catastrophe work was begun on a three-million-dollar concrete sea-wall, which was completed early in 1911. Its length is 5 miles and its height 17 feet above the mean low tide, and 3 feet higher than the highest storm water level. The grade of much of the city has also been raised by millions of cubic yards of filling, so that now the residents feel safe against any further great damage by the elements.

Another remarkable public improvement, recently completed at a cost of $1,500,000, is the wide causeway connecting the island with the mainland. It is slightly more than 2 miles long and 154 feet wide, except at a lift-bridge section, where its width is 66 feet. It carries railroads, trolley lines, wagon roads, and footways, and is of most solid and permanent construction.

These three great improvements—sea-wall, filling, and causeway—have cost more than seven and a half million dol-

A CANYON IN THE PLAINS: TEXAS

The rivers which run through the limestone plateau of western Texas cut through the rock until they form deep canyons. The typical canyon shown here was cut by Pump Creek near the city of Langtry.

lars, and the ability to provide for an expenditure of this sort shows marvelous enterprise in a city that was almost bankrupt after the catastrophe of 1900.

The harbor improvements at Galveston are a very good illustration of the money value of such operations. With a channel 30 feet deep and 800 feet wide, the largest vessels can today reach the great docks which are built along the water front, with accommodations for 100 vessels. The land-locked harbor has easy and safe anchorage for 500 more. The grain-elevator capacity here is 4½ million bushels, and a loading device delivers 70,000 bushels an hour into a ship.

THE VALUE OF HARBOR IMPROVEMENT

In 1890, before the army engineers began work on this harbor, there were but 14 feet of water on the bar, so that only small vessels could cross, and the few larger vessels visiting the port had to be served by lighters. A board of army engineers estimated that 10 million dollars a year would be saved by these improvements, or a saving in one year of nearly the total cost of the work.

As a result of the harbor improvements, freight rates on cotton from Galveston to Liverpool dropped from 60 cents to 27 cents a hundredweight, or $1.65 a bale. This amounts to six million dollars on the total amount handled annually. On grain the drop has been from 6 cents a bushel to 2¼ cents, and on other products the decrease has been proportionate. Applied to present business, it aggregates a difference of 30 million dollars a year, not to mention the great business given to the city by the natural increase in trade due to this great advantage.

Galveston has many delightful features. Her climate is warm, but the Gulf breezes usually temper the summer heat, and the winters have only occasional chilly spells of short duration. Its title, "The City of Oleanders," gives a clue to one distinctive feature, for in the handsome residence district these trees abound, and with palms and many other southland trees and plants give a charming aspect to the place and attract many winter visitors.

HOW AN INDIAN VILLAGE BECAME A CITY

But little more than a half century ago Waco was an Indian village; now it is a progressive city of nearly 30,000 inhabitants. It is situated on the banks of Brazos River, in the central part of the State, and is the metropolis of the most productive cotton-growing district. Twenty-five railroad lines bring it into close touch with the outside world, and it is claimed that nearly 2,000,000 persons are within four hours' ride of the Union Station. Waco is deeply interested in the conversion of the Brazos River into a ship canal—a project now in progress under direction of army engineers. The distance to the Gulf at Velasco is 425 miles, and the estimated cost is $4,000,000. It is figured that the saving on freight on outgoing cotton alone would be more than one and a half millions a year.

Austin, the State capital, is a city of about 30,000 inhabitants, and, while it is not growing as rapidly as some other towns, it is an important center of civic and educational interests.

The State Capitol is the finest public building west of the Mississippi; in size it is second only to the National Capitol at Washington, for its length is 566 feet, inclusive of portico, its width 289 feet, and its height 311 feet from grade line to tip of statue on dome.

The State University at Austin now has an attendance close to 3,000 and has a very high standard of completeness in equipment and tuition. The teaching force numbers 170, including many professors of high attainments.

Besides this university, the State system of education includes an agricultural and mechanical college near Bryan, a college of industrial arts at Denton, five normal schools, and a large number of high and common schools. This is supported by the largest public-school fund in the United States and by the usual taxes. Austin also has a large insane asylum and a great school for the deaf, with 454 pupils, all of whom are trained to be self-supporting on leaving school.

Beaumont is the ninth of the Texan cities in number of population, having about reached the 30,000 figure, including

its suburbs. The discovery of phenomenal bodies of oil at Beaumont in 1901 gave wide fame to the little coastal plain settlement.

Texas is well supplied with railroads, with mileage greater than that of any other State. Today it has a total of 15,322 miles, comprising transcontinental lines and many local connecting roads. However, there are still some large areas that lack desired railroad facilities. The increase in mileage has been rapid, rising from 711 miles in 1870 to 9,784 miles in 1900, 11,775 miles in 1905, 14,000 miles in 1911, and 15,322 miles in 1913.

Many millions have already been spent improving rivers and harbors in Texas and a large amount of work of this character is still in progress or projected. Parts of the coastal plain are being dredged and bays and channels deepened (see also pages 1353 and 1355).

Considerable progress has been made on parts of the intercoastal plain canal, to extend from the mouth of the Rio Grande to the west coast of Florida. This will give a protected course along the Gulf coast, partly in the many long bays and partly in canals through the lowlands.

NATIONAL GEOGRAPHIC SOCIETY

THE program of the meetings of the Society for 1913-1914 is printed below. All these lectures, with one or two exceptions, will be published in early numbers of the NATIONAL GEOGRAPHIC MAGAZINE.

November 14.—"Personal Observations and Incidents of Travel." By Judge William H. Taft. In this lecture the ex-President dealt with conditions in the Philippines, Japan, and China as he observed them during his term as Governor General of the Philippines and on his two journeys around the world.

November 21.—"The Grand Canyon." By Emery C. Kolb. Mr. Kolb and his brother made an adventurous trip through the Grand Canyon of the Colorado in a small boat, accompanied by a moving-picture machine. This trip was difficult and dangerous in the extreme.

November 28.—"The Panama Canal." By Col. William L. Sibert, U. S. A., member of the Isthmian Canal Commission and Engineer-in-Charge of the Atlantic division of the Panama Canal.

December 5.—"The Philippines." By Hon. Dean C. Worcester. There is probably no living American who has as intimate a knowledge of the Philippines as Professor Worcester.

December 12.—"Our Islands through a Motion-picture Camera." By O. P. Austin, Secretary of the National Geographic Society.

December 19.—"The *Nō*, the Classic Drama of Japan." By Mrs. Elsie Blattner. Mrs. Blattner will be assisted by her daughter, Miss Clara Blattner, who speaks Japanese fluently.

January 9, 4 *p. m.*—Annual meeting of the National Geographic Society at the home of the Society, on the Avenue of the Presidents.

January 9.—"Mexico." By Frederick I. Monsen.

January 16.—The Hon. William J. Bryan, Secretary of State, will deliver an address to the National Geographic Society on some subject to be announced later.

January 23.—"Alaska-Siberia Big Game Hunting." By Capt. F. E. Kleinschmidt.

January 30.—"China." By E. T. Williams, Chargé d'Affaires in Peking.

February 6.—"The Phœnician, Roman, and Byzantine Ruins of Africa (Tunisia)." By Frank Edward Johnson.

February 13.—"Savages and Semi-Savages; Singhalese and Javanese, Malays, Tibetans, and Dyaks." By Dr. C. William Beebe, Curator of Ornithology of the New York Zoölogical Park.

February 20.—"Rural England and Scotland." By E. M. Newman.

February 25.—Mrs. Harriet Chalmers Adams will deliver a lecture on this date, the subject of her address to be announced later.

February 27.—"Personal Observations and Incidents of Travel." By Judge William H. Taft. In his second lecture the ex-President will discuss his experiences in Cuba, Siberia, Russia, and his stay in Rome while engaged in settling the question of the Friars' Lands in the Philippines.

March 6.—Mr. George Kennan will deliver a lecture on this date, the subject to be announced later.

March 13.—"Life on a Sub-Antarctic Isle." By Robert Cushman Murphy, Curator, Division of Mammals and Birds, Brooklyn Museum.

March 20.—"Russia." By Dr. Edwin A. Grosvenor, Professor of Modern Government and International Law in Amherst College, author of "Constantinople," "Contemporary History," etc.

March 27.—"Geographic Influences in Japan." By Miss Ellen Churchill Semple, author of "Influences of Geographic Environment," "American History and Its Geographic Conditions," etc.

April 3.—"Camps and Cruises of an Ornithologist." By Frank M. Chapman, Curator of Ornithology of the American Museum of Natural History, New York.

April 10.—"My Wild Animal Guests." By Ernest Harold Baynes.

April 17.—Col. Theodore Roosevelt will deliver an address before the members of the National Geographic Society on some topic connected with his explorations in South America. This will be Colonel Roosevelt's first address on his return from South America.

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